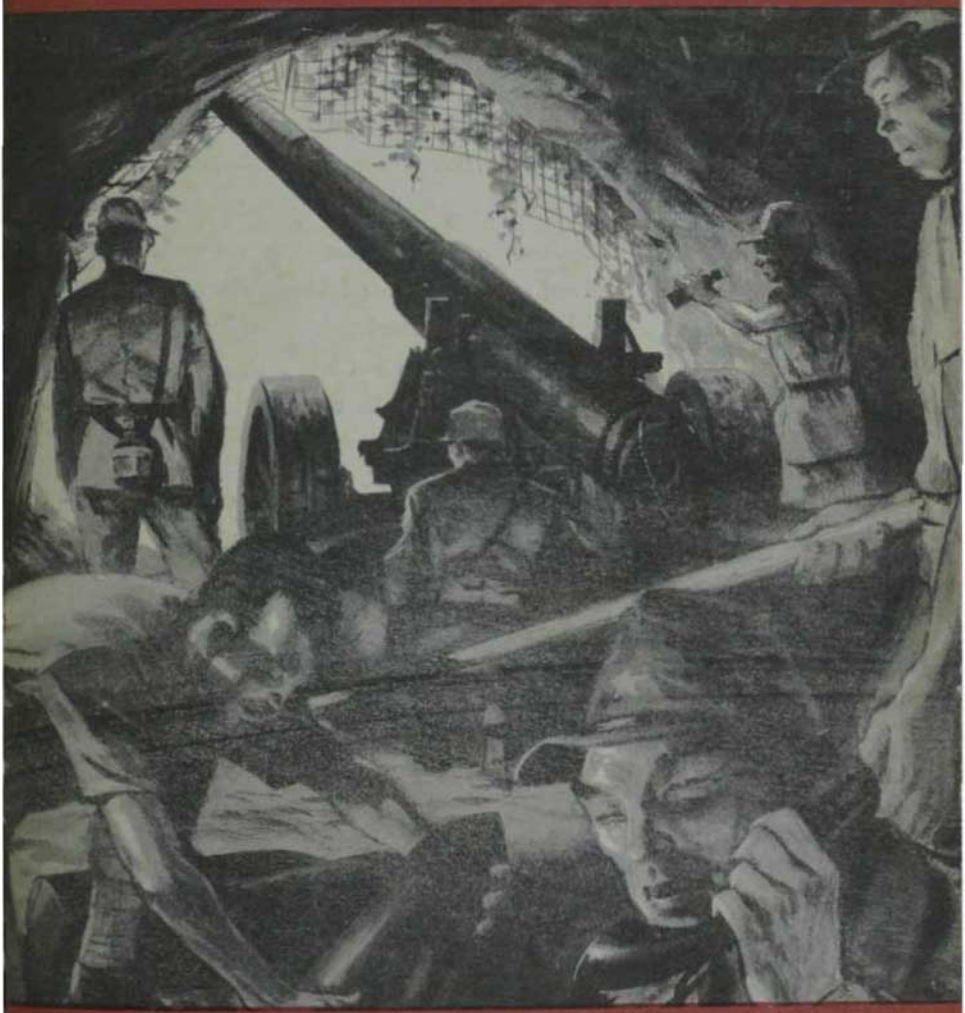
Intelligence Bulletin

VOL III NO 12
AUGUST 1945



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INTELLIGENCE BULLETIN

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Cover Illustration: *On Okinawa, the Japanese emplaced the bulk of their artillery in heavily camouflaged caves. This was done even with heavy pieces. Here a Jap gun crew prepares to fire a Type 89 150-mm gun.*

During the fight for Manila, U. S. troops had to reduce many Jap-held buildings to rubble (*See "City and Town Defense," p. 28*).

LATEST TACTICAL IDEAS

Okinawa Brings New Jap Developments

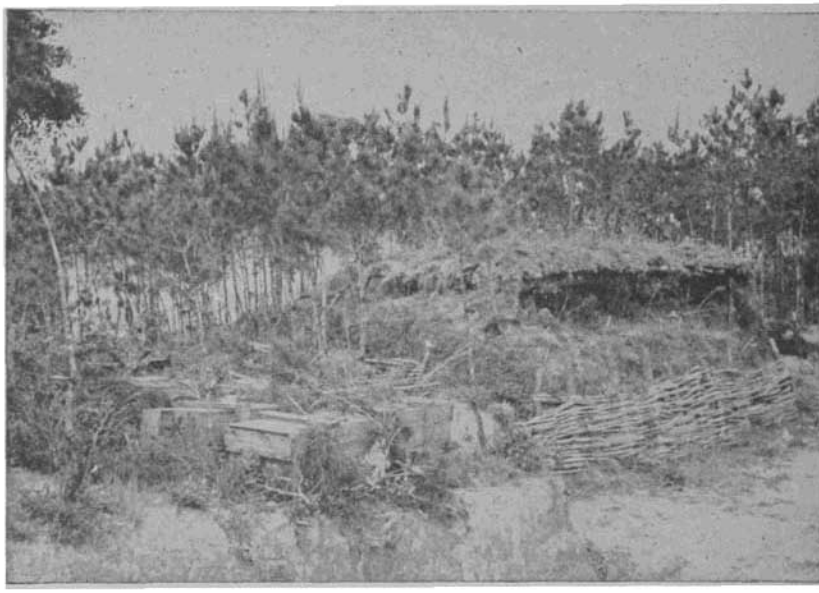
In the first few days of the Okinawa campaign, the Japs learned new lessons that were immediately useful in supplementing the experience they had gained on Iwo Jima. The result was a decision to revamp certain combat methods throughout the Okinawa command.

The latest Japanese tactical ideas include emphasis on (1) withholding fire until the Allied forces are so involved in the defensive position as to prohibit cover and support from naval gunfire and aerial bombardment; (2) maintaining a continuous front; (3) improving resistance against U. S. tanks; and (4) increasing Jap capabilities for conducting position warfare.

HOLDING FIRE

The necessity of guarding against premature opening of fire was of particular importance in defensive combat, the Japanese decided.

Abandoning the old annihilate-the-enemy-on-the-beach concept, the Japs declared that when huge invading forces were being landed, together with immense quantities of matériel, a new basic principle should be adopted. "Allow the enemy to land in full," they phrased it. Japanese fire was to be withheld until the attacking force had penetrated Jap positions and had presented excellent targets for their fire power. Moreover, fire was not to open until substantial U. S. forces had been



Heavily revetted machine-gun position on Okinawa covered from overhead observation by natural camouflage. Most machine-gun positions on Okinawa were tied in with other mutually supporting defenses.

lured to points where cover and support from naval gunfire and air bombardment would be ineffective.

The Jap reasoning behind this plan is worth noting. An attacking force, the enemy observed, would not land and advance until it had succeeded in destroying Japanese fire power. "Actually, this is very difficult to carry out," they said. To destroy the fire power, the Americans must determine first of all whether it exists, and then find out how it is organized. The invader's best way of ascertaining this information is to have us open fire prematurely on a powerful force which is in an area where it can still maneuver. Once the organization of our fire power is discovered, the Americans will certainly destroy it without considerable loss to themselves—that is, unless their

Two of three Japs killed when U. S. troops attacked a fortified burial vault. There were still three live Japs entrenched inside the vault when this picture was taken. Okinawan tombs were used extensively.

strength is simply insufficient. On the other hand, if we withhold our fire until the invader has been lured on by absolute silence on our part, we will avoid casualties from gunfire and air bombardment, and will be able to destroy the invader's main force, enjoying the maximum advantage in situation and range.

Comment: In the actual operation on Okinawa, the Japanese followed these instructions almost literally. Only the most scattered opposition was encountered by the landing forces, and Allied troops had moved well into the defended area before fire was placed on them.

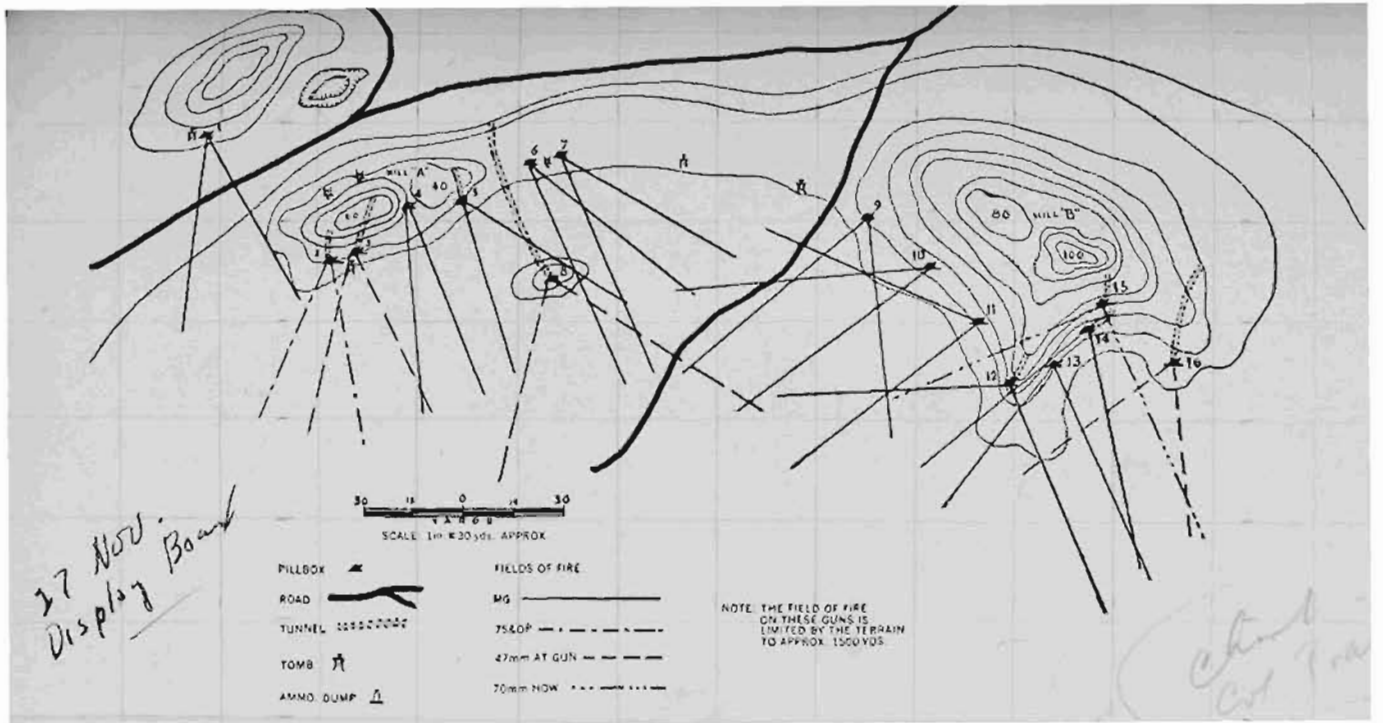
MAINTAINING A CONTINUOUS FRONT

The Japs had been alarmed by the tendency of units to concentrate on individual self-defense to the detriment of the common front. That such a tendency might lead to panic with disruptive results was evident to the enemy command on Okinawa. For this reason it was decided to stress to all concerned the importance of maintaining a continuous front.

In this connection it should be remembered that the Jap strategy for Okinawa involved sacrificing much of the terrain, to permit withdrawal to relatively small areas where the defense could be made compact and strong. The purpose, of course, was to force the invader to fight a protracted campaign. The Okinawa terrain had permitted the Japanese to construct what they called "a steel ring of positions around the area in which tanks are able to maneuver." Defensive operations in this ring would depend on "the complete and mutual faith" of all the Japanese units involved, the army responsible for that area was told. In other words, if any one part of the ring were broken, the defensive potential would rapidly become paralyzed and the destruction of the entire system would result.

"We must realize," the command on Okinawa explained, "that the defeat of one unit and the smashing of positions on one part of the front will endanger the operations of all units on all fronts." That is, when one strongpoint falls, the other strongpoints in the line begin to doubt the defensive power of neighboring positions, and each concentrates on strengthening its own independence.

"Even though such efforts may be well meant," the Japanese command observed, "there is an inevitable tendency for all troops to lose their presence of mind. In hastily building up the resistance power of an individual unit, one may sacrifice too much of that common effort which should go into strengthening the 'steel ring' of positions. The fighting strength of a

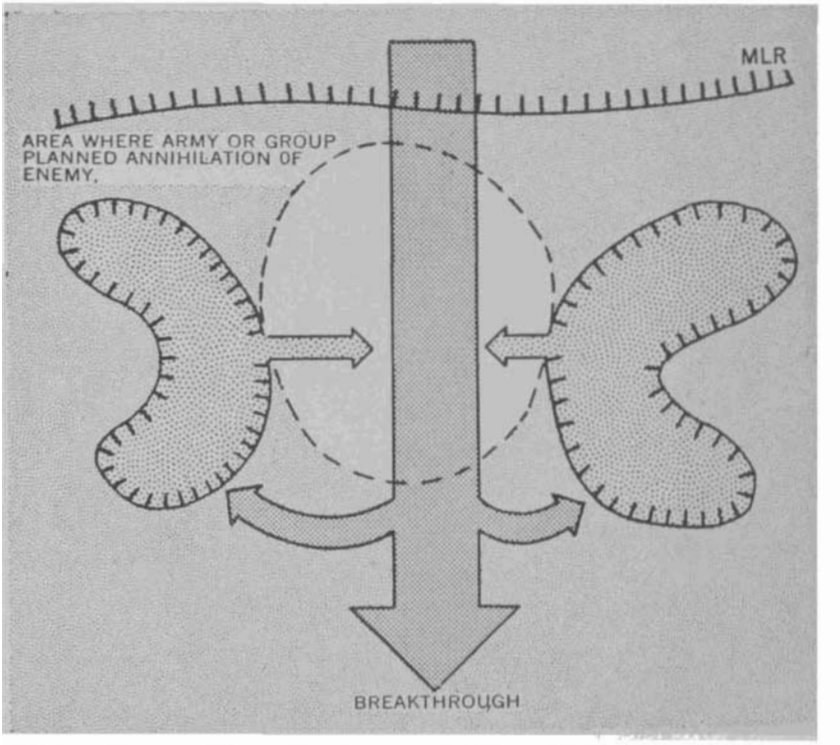


Field sketch of part of the Japanese defensive line on Okinawa. Artillery and antitank pieces were emplaced in caves and pillboxes sited to provide over-lapping fields of direct fire.

unit is thus directed too much to the flanks and rear, gaps may be caused along operation boundaries between sectors, and the strength of the front may be so weakened as to lead to the eventual destruction of the entire army."

The drawing on this page is adapted from a Japanese example of what may happen when too much strength is disposed on the flanks, as a result of distrusting the strength of adjacent units.

Allied forces have taken advantage of just such situations in the past, the enemy troops on Okinawa were warned. And they were reminded that no matter what precautions any unit may take to ensure independent self-defense, if the organiza-



A Jap diagram illustrating how a position will be penetrated throug its center if too much strength is concentrated on the flanks.

tion of a whole defensive system is jeopardized, that unit will suffer the common fate. Even though it achieves temporary safety, it eventually will be pulverized.

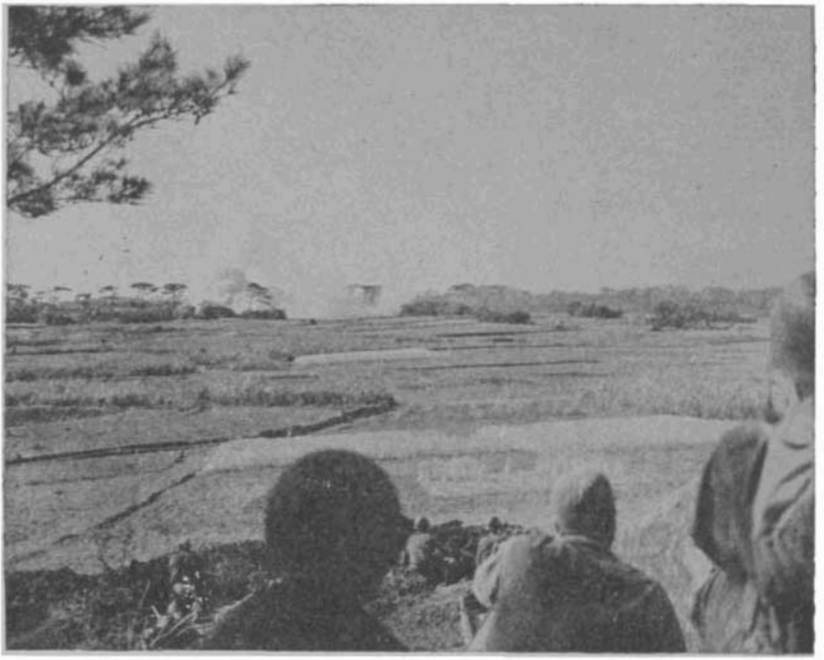
Comment: These instructions were likewise followed explicitly in the fighting on Okinawa. Continuous areas of resistance were organized throughout the width of the island. Coordinated and interlocking fire was used to cover unfortified areas between strongpoints. The large number of weapons sited in any particular area made penetration of such an area difficult.

ANTITANK MEASURES

"The enemy's combat strength lies in their tanks," the Japanese command advised. "It is becoming more apparent that land combat is combat against U. S. tanks. All organization of defensive positions must be based on this premise." Terrain, especially roads, where U. S. tanks can advance easily must be blocked. In a coastal belt, non-essential roads are to be demolished and thus denied to the invader. Full preparation must be made for blocking essential roads with mines and other obstacles on short notice.

Antitank ditches, it is pointed out, usually are not worth the labor needed to construct them, inasmuch as U. S. tanks can negotiate such ditches with relative ease. Where they are used, however, they are to be prepared as pitfall traps and cleverly camouflaged. Well-dispersed minefields will escape serious damage from bombing and shelling, the Japs said, and should prove quite effective. And they added, "in general, the ability of U. S. armor to cross difficult terrain must not be underestimated."

In antitank assaults, fire power must be organized and coordinated with the work of assault teams, to wipe out American infantry accompanying, or riding on, tanks. All automatic



A pattern for attack on Okinawa. American tanks supported by infantry (in background) and machine guns (one in foreground) move across the fields to attack Japanese positions being shelled with smoke. The infantry reserve waits along the road and hedge in the left center.

weapons must be used for this purpose, as well as all possible heavy high-angle weapons, such as battalion guns, mortars, and grenade dischargers.

The Japanese are satisfied with the performance of their 47-mm antitank guns against M4 tanks if fire is withheld until the tanks are within close range. Flame-throwing attacks should be made on the rear of the tanks, the enemy recommends, near the exhaust and intake pipes.

The development of "both material and psychological measures" against U. S. tanks is prescribed by the Japanese, who say that the increased use of this weapon on Iwo Jima was principally responsible for the destruction of their main posi-

tions. The following methods of destroying one American tank are suggested: attacking the belly plate with the improvised 10-kg mine, attacking the top of the engine with the 10-kg *Futon* ("blanket") mine, or attacking the sides with the 5-kg hemispherical mine. Apparently these are all new items of matériel. As late as 6 March, information regarding their construction and use had not yet been disseminated throughout the Okinawa garrison.

From another Japanese source comes an explanation that the blanket mine "is made simply by placing TNT in a canvas bag about the size of a seat cushion. The fuze assembly for the bomb is made by putting together the Type 1 igniter, the Type 1 fuze, and the Type 97 detonating cap. Although the mine is intended to be thrown on top of tanks, it will still be

U. S. infantrymen move forward through a garden area on Okinawa.

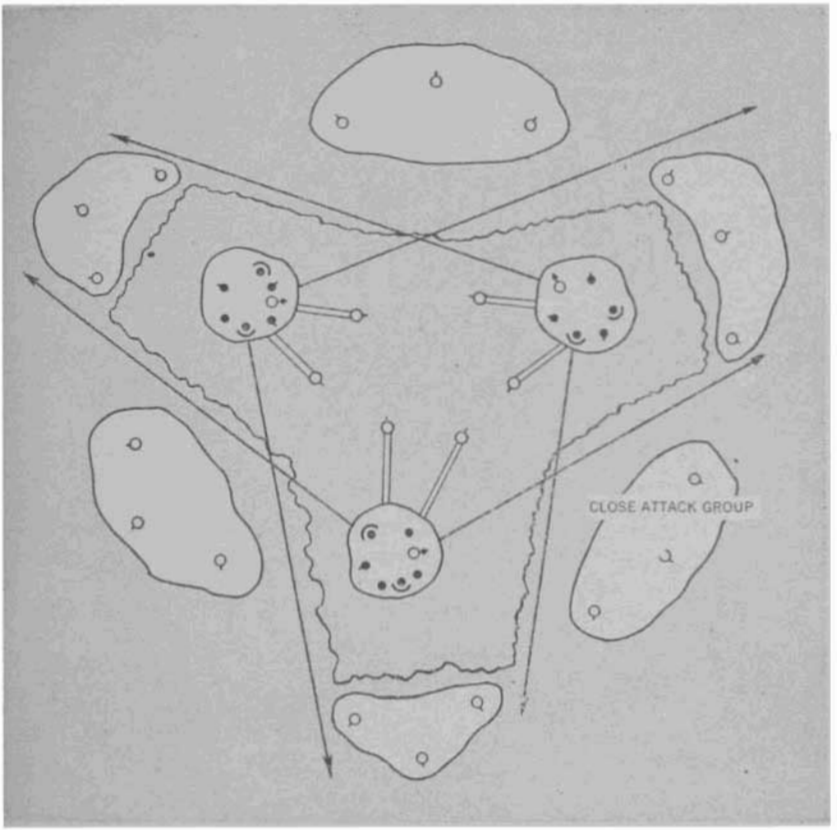
effective even if it falls underneath the tank, provided that the time fuze is set to go off in 1 or 2 seconds. All units can make this weapon quickly and easily with materials now at hand. Its effectiveness is assured, and its use against tanks at close range is strongly recommended. Seven to 10 kilograms of powder should go into mines to be used against medium or heavy tanks, and 5 kilograms in mines to be used against light amphibious tanks."

Comment: On Okinawa, normal Japanese antitank measures were used. These methods were so completely and thoroughly employed as to constitute the strongest antitank defenses yet encountered in the Pacific Theater. Minefields were tactically well sited and were covered by the fire of weapons of all types and calibers. A considerable use was made of suicide tank-hunters but the main reliance was on fire power from guns sited in caves and tunnels.

IMPROVEMENT OF POSITIONS

The Japanese command noted that, in the initial organization of positions on Okinawa, some of the rifle ports and gun embrasures had been conspicuously exposed to naval gunfire. Others had been constructed on high ground, where they could too easily be discovered. Furthermore, there were still others which had a maximum of dead space and a minimum of cover. "In the light of battle lessons learned on Iwo Jima," the enemy observed, "where 6 out of 11 casemates were destroyed in the three days prior to the landing, it becomes obvious that our losses will be heavy. Consequently, revisions must be made, and positions organized so that cover (against fire from flanks and rear) is provided by natural terrain features."

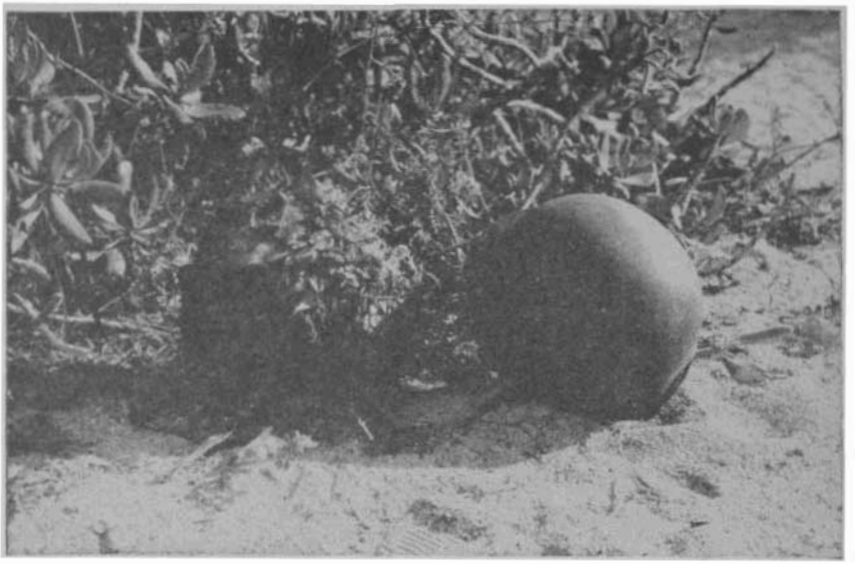
The Japanese defense command decided that the dead space in front of such fortifications as cave positions should be eliminated by making these positions mutually supporting. Defenses



Japanese sketch of a strongpoint showing mutually supporting "fire points" built around cave-type positions with a light machine gun, riflemen, and close attack personnel in spider holes.

against flame and gas would have to be provided. And the resistance of ports and embrasures to 75-mm tank fire and shelling would have to be increased.

The Japanese command evidently was sold on the idea of constructing a large number of dummy positions for the purpose of luring U. S. forces into scattering and wasting their fire, and thus decreasing the quantity of shells fired against true positions. For some reason the enemy overestimated U. S. readiness to fire on unidentified targets.



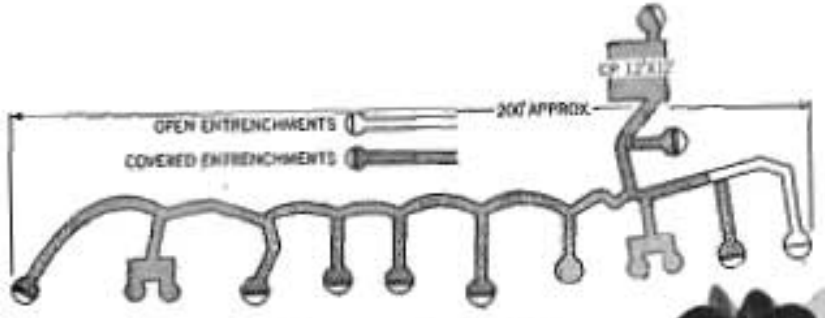
A camouflaged Jap helmet, taken from a night-infiltrating Jap killed on Okinawa, sits to the left of an uncamouflaged American helmet. The Jap camouflage blends excellently with the local vegetation. Night "penetration attacks" were common during the fighting on Okinawa.

A dummy Type 96 single-mount 25-mm machine cannon constructed by the Okinawa Japs. A rough job but very realistic.

More practical was the enemy's insistence on the preparation of "jack-in-the-box" positions, with caves as key attack points, within anticipated beachhead areas. He was aware of the difficulty of infiltrating into U. S. beachhead areas, "which are protected by intensive fire nets and by obstacles." Troops in these well-camouflaged "jack-in-the-box" ambush positions remain in hiding until the U. S. line has advanced a considerable distance beyond them. Then, coordinating their attack with that of forces in the main Japanese positions, the hidden troops emerge unexpectedly "to confuse and annihilate the enemy from within." The enemy decree that even in position warfare, troops should fight in teams of two to five men each is worth remembering.

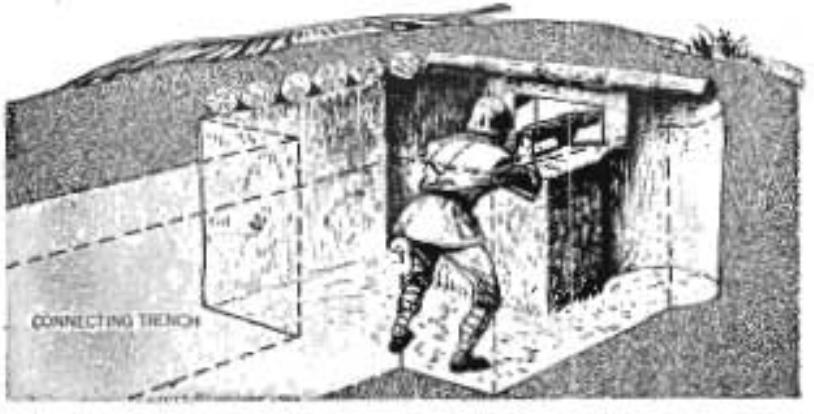
A common fault of Japanese antiaircraft positions, the enemy command thought, had been their habit of opening fire on Allied planes at unpromising ranges, thereby exposing the location of camouflaged positions. In addition, losses had been incurred from U. S. heavy caliber weapons. To counter this, it was ordered that antiaircraft positions should be established a good distance away from other ground positions, and that antiaircraft guns should hold their fire until hostile aircraft came within a range "at which hits are certain."

Comment: The Japanese brought cave warfare to its highest stage of development on Okinawa. Cave positions were well sited and organized, and were well manned and supplied. Fields of fire were widened to the maximum extent permitted by these underground positions. Dead spaces were overcome by the siting of large numbers of weapons from mutually supporting positions. Obstacles, mines, and gunfire were used to prevent the close approach of Allied infantry and tanks to cave entrances. A large number of reserve positions were constructed, and these served to divert Allied fire from cave openings that were actually manned.



JAP DEFENSES IN BATANGAS

These typical enemy positions were encountered on Hill 600, about 3,000 yards southwest of Santo Tomas in Batangas Province, Luzon. The positions were constructed prior to our landing on Luzon, possibly in preparation for an attack from the direction of Batangas Bay. The presence of unused cement around the positions indicates that additional work was to be started on these installations, had time permitted. This sketch represents only one of hundreds of such emplacements encountered in the area.



Artillery On Okinawa

During the height of the Okinawa campaign, soldiers and marines of the U. S. Tenth Army experienced Jap artillery fire on a scale never before faced by our troops in the Pacific. The defense of Okinawa, a campaign for which the Japs had been preparing for more than a decade, was outstanding for the quality and quantity of artillery support used by the enemy in bolstering his formidable Naha-Shuri-Yonabaru line.

Until the earlier assault on Iwo Jima, the use of artillery by the Jap Army had been sporadic and ineffective. Batteries generally were broken down into sections, or even single guns, which were used indiscriminately by infantry commanders in front-line support of their troops. Concentrated fire of four or more guns against a single target was the exception rather than the rule, and there was no evidence of coordination and control of the fire of units larger than a battery. Certainly, battalion and regimental fire-direction centers, as they are known to U. S. artillerymen, were nonexistent in the Jap armies in the field. In fact, until recently the Japs appeared to ignore even their own artillery doctrines which, though they cannot compare with more modern techniques, can be uncomfortably effective under reasonably static battle conditions.

Throughout the Philippine operations, Jap artillery reaction has been spotty and inefficient. But when U. S. Marines stormed ashore at Iwo Jima last February, they met the first effective Jap use of large-scale artillery coordination in defense of an island. Iwo was a preface to Okinawa.

But unlike Iwo, on Okinawa the soldiers and marines of the U. S. task force were permitted to swarm ashore relatively unopposed on L-Day. Within the week, however, U. S. troops pushing south toward the island capital of Naha found themselves digging in under concentrated artillery fire which supported the Naha-Shuri-Yonabaru line.

MASSED FIRE

The use of artillery by the Japanese on Okinawa was the most effective yet encountered by Allied troops in the Pacific-Asiatic theater. It is clearly evident that the Japs have come to appreciate many of the capabilities of artillery, and now are trying to make full use of this weapon within the limits allowed by their present doctrine, equipment, and training. But perhaps the most significant development is the evidence that the Japs now realize the importance of a central headquarters to control the fire of batteries. Undoubtedly the Japs on Okinawa had such a central headquarters where they were able to coordinate the fire of several batteries, or of more than one battalion of artillery. This coordination produced the first large-scale massed fire used by the Japanese.

Fire in mass can be achieved by one of two methods: by using a fire-direction center, as is U. S. practice, where targets are plotted and fire orders are issued simultaneously to a number of batteries; or by coordinating the fire of a number of batteries on a designated area, on which all guns have been previously registered. The former method requires fairly intricate survey methods, but permits the rapid adjustment of massed fire upon targets of opportunity. Although the latter method is less intricate, fire control is more cumbersome.

There is no evidence that the Japs on Okinawa maintained either one or more fire-direction centers of the type employed by U. S. artillery units. The defenders did, however, have ample time to install the guns and communications necessary to keep within an artillery headquarters a reasonably coordinated control of artillery fire based on previously registered target areas. For years the Japs have been fortifying Okinawa, hewing caves and gun positions out of the coral-like rock of the hills. Positions were prepared for guns of all calibers, many of them in camouflaged caves. Antiaircraft guns were emplaced

on many of the hills in the southern portion of the island, and the larger caliber antiaircraft weapons were used against ground targets.

The existence of centralized artillery control was definitely indicated when a Jap plan for the organized use of artillery and artillery mortars was discovered. The major portion of the medium and long-range artillery was grouped in the center of the Jap defensive zone. Dispositions provided for overlapping fields of fire, and guns were situated to deliver reinforcing fire against attacks from any direction.

TYPICAL BATTERY

Although not part of the Naha-Shuri-Yonabaru defenses, a battery of Type 89 150-mm field guns on Motobu peninsula illustrates a typical battery position on Okinawa. The guns,

At night, guns which had remained hidden in caves were pushed to the cave entrances and fired. But when the Japs received counterbattery fire, they would draw their guns back into the caves.

which were emplaced to cover the off-shore island of Ie Shima, were located in caves in a steep draw. The surrounding hill mass limited the field of fire to 40 degrees, but provided a defilade which protected the battery from all except high-angle naval gunfire or bombs.

Despite the fact that the guns were of a type resembling our own 155-mm "long toms," they were so emplaced in the caves that only a few feet of the tubes protruded from the cave openings. Camouflage nets protected these from overhead observation, and detection would have been practically impossible even during periods of firing. Ammunition was stored in separate caves, and the gun crews lived in defiladed barracks in the draw.

On a hill 400 yards from the battery, an observation post was so located that only a small aperture was exposed to view. A tunnel connected this observation post to the quarters of the fire control personnel. Wire communication was established between the observation post, the command post, and the guns. Fire-control equipment included a 20-power scope, plotting board, computing equipment, and other instruments of the artilleryman's trade. The whole battery area was excellently camouflaged by farms and native huts which gave no clue to the existence of artillery in that locality.

FIRE CONTROL

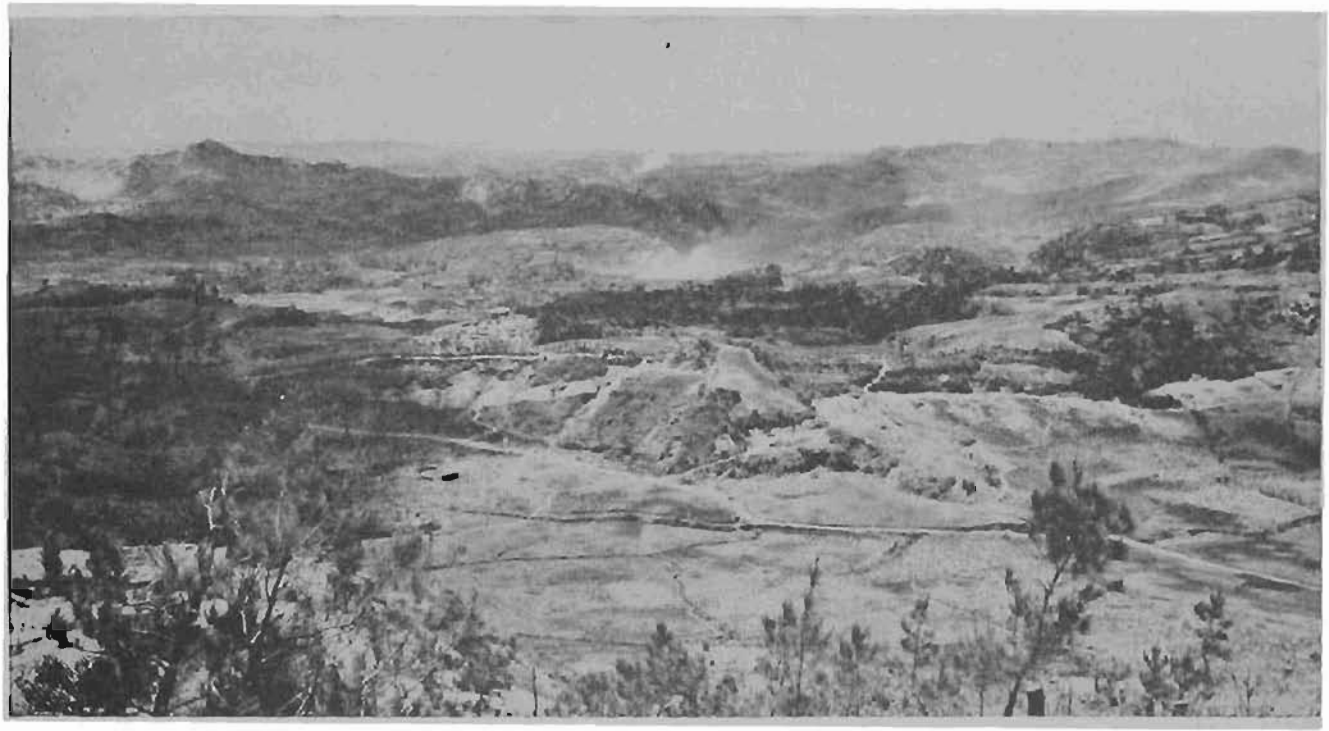
Since the Japs had ample opportunity both before and after L-Day to register their guns on check points and prospective target areas, and since a fairly stabilized situation came about, the enemy was able to make maximum use of his artillery doctrine. In order to deliver prearranged fire with any speed, a system of target designation must have been developed. The exact nature of this system is not known, but since the terrain provided the Japs with excellent observation, it is logical to

assume that observers reported prospective targets to an artillery headquarters, which in turn ordered one or more batteries to fire according to previously plotted registration. This method seems likely, since U. S. troops received artillery fire immediately upon entering some areas. But fire was not received in all areas within range of the Jap artillery, which indicates that the Japs were not using the more flexible methods of U. S. artillery fire-direction centers.

Although the Japs on Okinawa used the simpler and more cumbersome method of massing their artillery fire, the concentrations were just as effective as any that could have been brought about through the more intricate technique of the fire-direction center. The Jap gunners did not, however, demonstrate an ability to fire their pieces as quickly as American artillerymen would have done under similar circumstances.

The size of the concentrations varied. In one 3-hour period, a total of 4,500 rounds of artillery fell in one division area. On another occasion, 300 rounds from eight guns were fired within a 20-minute period—not a particularly acceptable performance by modern artillery standards. Yet on May 4, from 12,000 to 14,000 rounds were fired in a 24-hour period by the Japs in support of a counterattack. On several other occasions the Japs seemed to recognize the value of artillery preparation for counterattacks. The Jap commanders likewise showed an understanding of the importance of artillery support for infantry troops fighting in defense of their positions.

Interdictory and harassing fire into the U. S. rear area was not delivered to the full capabilities of the Jap guns. This was probably due to poor observation into areas far behind the immediate front. The Japs did, however, recognize the value of a good ground observation system, and fought bitterly to hold or recapture dominating terrain where artillery observation posts could be maintained.



Terrain on the eastern flank of the Naha-Shuri-Yonabaru line, looking south toward the Jap defensive area. Conical Hill is in the left of the picture, while Shuri is in the distance over the ridge to the right. Conical Hill and similar terrain features provided excellent artillery observation posts. A view of the terrain to the left of this picture may be found on pages 56 and 57.

For the first time the Japs made considerable use of their artillery at night. Prearranged concentrations aided in this night firing. Guns, which in the daytime would remain hidden in caves, at night apparently were pushed to the cave entrances and fired. In some cases the Japs appeared to locate the positions of U. S. batteries at night, and then would conduct counterbattery fire at daybreak, adjusting fire by observation. But when the Japs received counterbattery fire, they would draw their guns back into the caves.

CONCLUSIONS

To summarize, the Japs on Okinawa did not depart from Japanese artillery doctrine, but made maximum use of the techniques prescribed in their artillery training manuals. But, because the Japanese artillery doctrine requires ample time in which to develop a fire plan, and a stable situation in which to employ it, it is unlikely that in a mobile situation the Japs will be able to achieve results similar to those on Okinawa.

The Japs recognize the need for registering their guns in advance on every potential target area, and will undertake these fire adjustments whenever time permits. They always have stressed the importance of artillery observation, and their observed fire is highly accurate. Similarly, they always have recognized the importance of good communications between an artillery headquarters and its batteries; but this principle has never been observed to a great extent until the battle for Okinawa and, to a lesser extent, Iwo.

The Japs know that, to gain maximum effect, artillery concentrations must be fired quickly, but to date their gunners have not achieved the rapid proficiency of American artillerymen.

U. S. troops may regard the Jap artillery fire on Okinawa as a pattern that may be encountered during future operations in and around the home islands of Japan.

JAP COMMANDO UNITS

It has been established that two Japanese commando units were present on Okinawa during the recent campaign. This is believed to be the second time that Jap commando units have been met during the Pacific war. The first encountered were on Morotai.

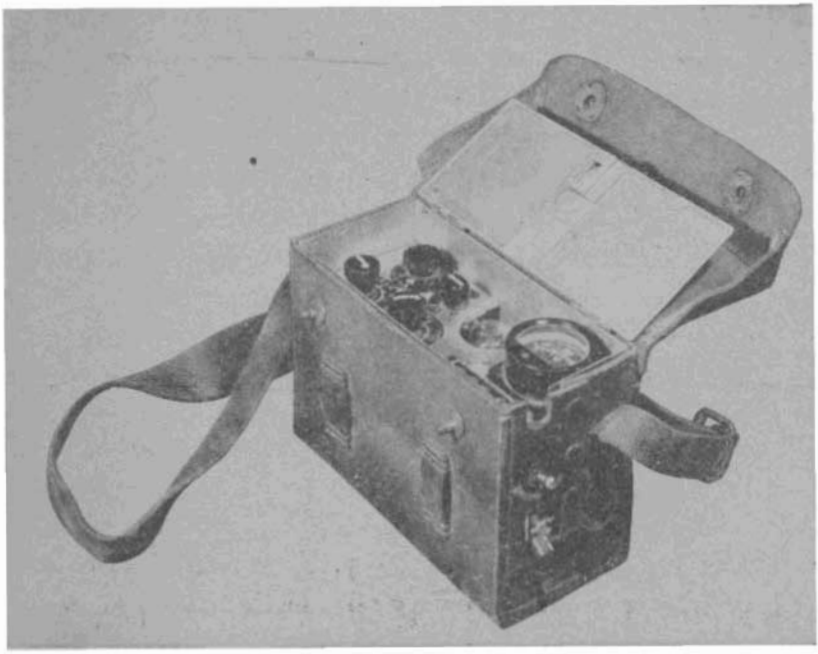
The exact role the commando units played in the defense of Okinawa has not been determined. It is known, however, that the training of these units is similar to that given U. S. Marines.

Commanding officers of commando companies and units stress "spiritual" training a great deal and emphasize "blood oaths," by terms of which all personnel resolve to sacrifice themselves for the Emperor after having caused great damage to their enemies. Combined with this "spiritual" training is intensive schooling in such fields as personal reconnaissance, night infiltration, and other related small-unit tactics.

The basic tactical organization of the commando unit is the commando company. There may be from two to 12 companies in a unit. Each company is believed to consist of three platoons, each of which contains three sections. One small signal section is included for each company. Under this organization, the T/O of a commando company is approximately 190 officers and men.

Literally armed to the teeth, each commando company is outfitted with 38 rifles, 39 pistols, 10 automatic rifles, 334 hand grenades, 4 light machine guns, 4 grenade dischargers, 50 brick-shaped incendiaries, 60 canned incendiaries, 300 instantaneous igniters, 300 time igniters, 8 tube-type rubber boats, 9 cliff-scaling hooks, 4 two-section portable boats, and 2 radio sets.

JAP WALKIE-TALKIE



Tests conducted with four Japanese Type 94 (1934) Mark 6 radios on Luzon reveal that it is possible for this amplitude-modulated set to communicate with both the U. S. SCR-610 and SCR-608 FM sets. A small two-unit set of the Walkie-Talkie design, the Type 94 Mark 6 is standard equipment within the Japanese infantry battalion.

Results of the texts show that the enemy sets operate satisfactorily with the SCR-610 within a range of 1/4 to 1 1/2 miles, and with the SCR-608 within a range of 1/2 to 4 1/2 miles. Operation outside these ranges is not recommended. The tests were conducted by the Signal Technical Intelligence Team, I Corps, in conjunction with signal personnel from the 25th Division.

The SCR-610 was set up in a truck, with a battery pack and

an AN-29 antenna. The signal transmitted by each set was tuned in on the receiver of the other with the two radios side by side. The signals in both sets were very weak, but readable.

Following this, the SCR-610 was moved to successive locations ranging from 200 yards to 2½ miles away. Within the range of ¼ to 1½ miles the two sets operated together satisfactorily for two-way communication without retuning the Type 94 Mark 6. After the initial move to a location ¼ mile from the Type 94 Mark 6, however, it was necessary to retune the Jap set. Communication was sporadic at distances from 1½ to 2¼ miles.

Installed in a command car, the SCR-608 was operated from a stationary location, while the Type 94 Mark 6 was carried in a truck. The signal transmitted by each set was tuned in on the receiver of the other with the two radios side by side. The signals in both sets were loud and clear.

Tests were conducted by moving the Jap radio to successive locations 200 yards to 5 miles away. As was the case with the SCR-610, retuning was necessary after the initial move. Within the range of ½ to 4½ miles, the two sets operated together satisfactorily, with tuning very critical. Beyond 4½ miles communication was sporadic and subject to interference from adjacent channels. The signal from the Type 94 Mark 6 was not strong enough to operate the "squelch" [1] of the U. S. set beyond ½ mile.

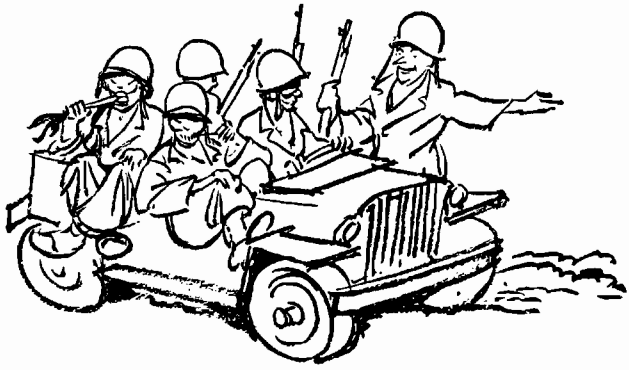
Two flat No. 4 batteries for filament and six Type B-18 batteries for plates—the batteries delivering 3 and 135 volts, respectively—are used by the Japs for the Type 94 Mark 6. These batteries fit in the battery box of the radio set.

If Japanese batteries are not available, the set may be operated with two Signal Corps BA-23 and six Signal Corps BA-2 batteries, all of which will fit in the battery box except one

[1] "Squelch" refers to the stoppage of oscillation.

BA-23. The extra BA-23 may be carried in the headset pouch attached to the battery box carrier. For reduced weight the BA-23 batteries may be replaced by four or six BA-30 batteries connected in series parallel to give 3 volts, although this will give shorter battery life.

Due to a shortage of the Japanese UZ-30MG tubes used in the Type 94 Mark 6, it may be necessary to perform a field conversion so that Type 19 or similar U. S. tubes can be utilized. Because Japanese microphones and headsets are of rather poor quality, it is also recommended that U. S. Type T-17 or similar microphones and U. S. Type HS-30 or similar headsets be adapted to replace them.

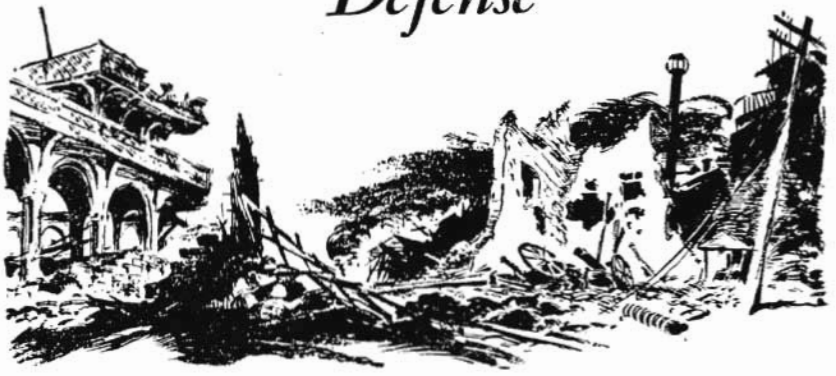


Infiltration in Style

An artillery officer from the Philippines has reported a neat bit of high-class Jap infiltration that worked:

Near Olongapo, Luzon, last February an officer and three enlisted men riding in a Jeep approached a sentry at about 0100 hours and inquired as to where he might find "Headquarters." The four men in the Jeep wore American uniforms, and the individual in charge spoke perfect English. The sentry directed them to the general area, and within 30 minutes several heavy guns, trucks, and a small supply dump were completely demolished by explosives.

City And Town Defense



In recent operations the Japanese have continued to concentrate organized resistance in rugged terrain in an effort to neutralize Allied superiority in matériel and to reduce the effect of Allied advantage in the air. Whenever possible, urban areas (such as Naha, Shuri, and Yonabaru, on Okinawa) have been used to anchor and strengthen positions prepared on natural lines of defense in hilly country. Cities in open terrain have been defended in various ways. An all-out defense was made in Manila, a delaying action was fought in Mandalay, and Rangoon was virtually yielded without a fight.

In open country, the Japanese appear to defend a town for one or more of the following reasons: (1) to inflict heavy casualties which, in their view, will more than compensate for the complete loss of the Jap garrison; (2) to delay an Allied advance and thus permit the escape of Jap troops not directly involved in the action; (3) to delay Allied attainment of vital objectives; and (4) to delay an Allied advance until conditions again permit the Japs to take the initiative or favor their withdrawal.

Thus far no attempt at any well-organized defense in open

terrain has been made. In the final stage of the Burma campaign, fought in relatively open country, the Japs planned to defend by a series of delaying actions designed to contain the British forces at least until the monsoon set in. Several of the positions chosen for defensive operations were based on towns which were focal points in the communication network. However, the rapid disintegration of Japanese armed forces in Central Burma was so complete that little organized resistance was encountered south of Meiktila. So, except for the operations in Mandalay and Meiktila, no opportunity has been available to observe a Japanese defense of inhabited areas which was coordinated with a withdrawal in open country.

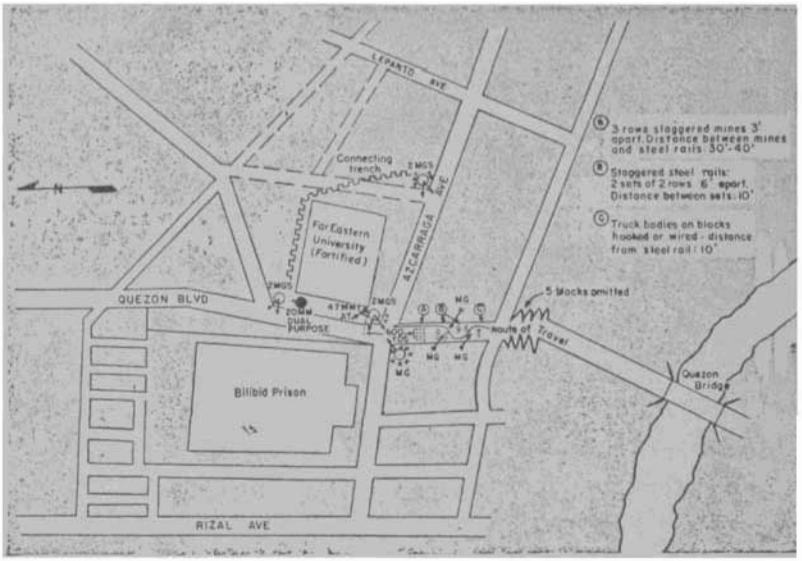
In the Philippine Campaign, the Japs defended several small towns, mainly to enable their forces trapped in southern Luzon to escape to the northern hills.[1] On the other hand, the basic idea behind the defense of Manila seems chiefly to have been to inflict a large number of casualties on U. S. troops at a relatively small cost to the defenders. The Japs apparently believed the loss of the garrison a reasonable price to pay for the expected American casualties.

USING TERRAIN EFFECTIVELY

The Japs make effective use of both the natural and artificial features of the terrain in planning and preparing their defensive works in urban areas. In planning, they attempt to predict the directions of Allied attacks—and with reasonable success thus far. Usually the defense has been organized around a core consisting of the city's strongest buildings, and natural antitank obstacles have been utilized.

The over-all organization of city defenses has not been too well arranged, as a rule. The various strongpoints generally have been well laid out and, to some extent, designed to be

[1] See INTELLIGENCE BULLETIN, Vol. III, No. 10.



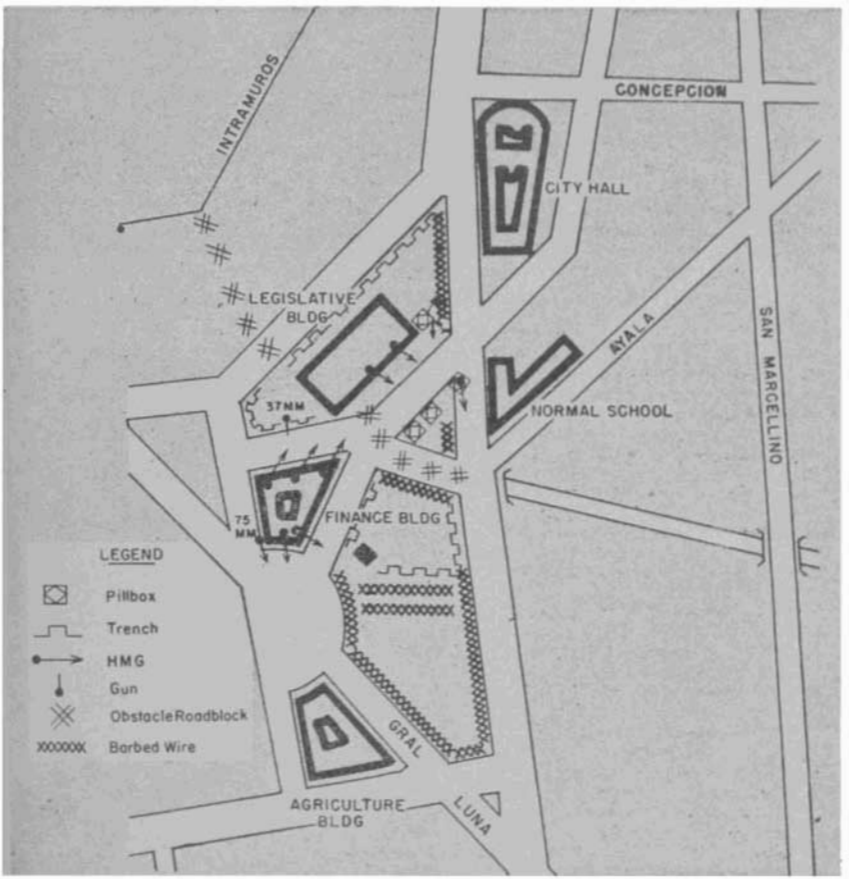
Far Eastern University area, Manila. The purpose of defending this area was to deny U. S. troops use of Quezon Boulevard and its approach to Quezon Bridge.

mutually supporting, but coordination among strongpoints has not been consistent enough to ensure continuously effective assistance under heavy assault. Communications have not been arranged to maintain contact between the various strongpoints during combat. In some instances, moreover, the Japs have failed to select covered assembly areas from which counterattacks could be launched against the attackers' flanks, rear areas, or lines of communication, and to prepare successive lines of prepared positions to which hard-pressed defenders might retire. Supplies and equipment have been placed under cover in the vicinity of, or directly under, organized positions which were to be held at all costs. The preservation of routes of retreat has been planned only when the mission of the garrison has been one of delay and not one of complete self-sacrifice—as was the case at Manila.

PREPARATION OF BUILDINGS

Since the center of any Japanese defense in an inhabited area is a core composed of the most solidly constructed buildings available, the preparation of this core is most important. It may vary from such strong, heavy construction as that in the Intramuros district of Manila to the fragile buildings of a small Philippine town.

Thus far, Jap operations in inhabited areas have made considerable use of the "city walls" so often found in the Orient.

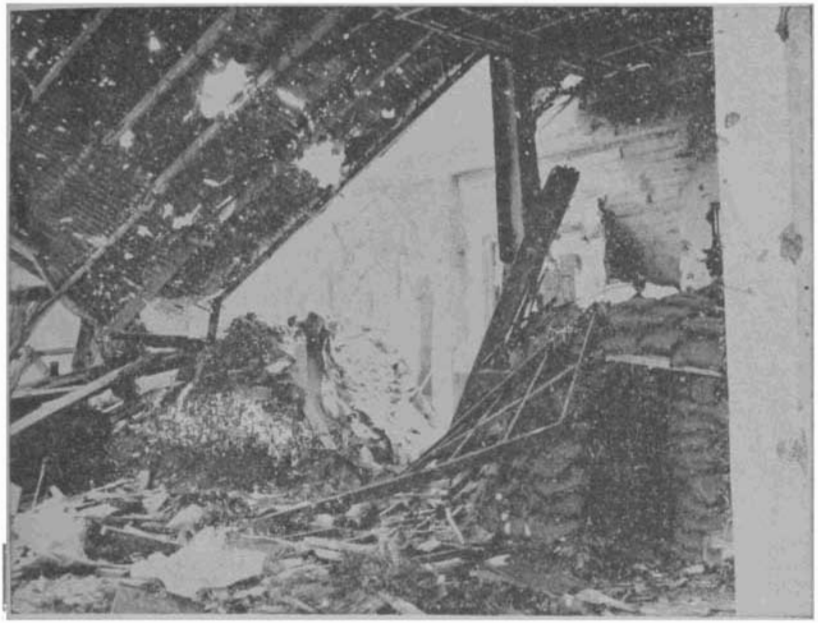


Street and building organization, Manila.

Pillbox and connecting trench.

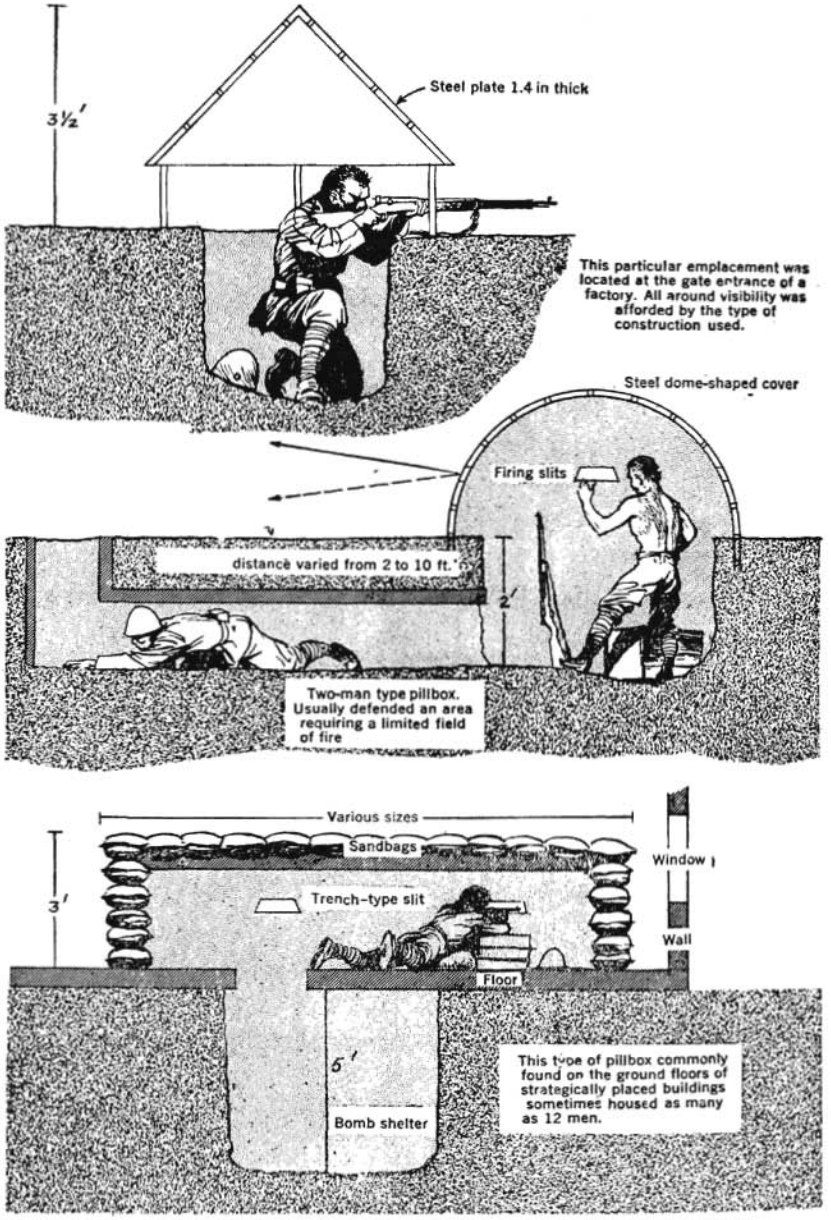
Infantry heavy weapons and artillery have been emplaced in embrasures in city walls. When no such firing ports have existed in the first place, they have been constructed by the defenders and have been arranged so as to permit flanking fire against an attack from any direction. Fields of fire of individual weapons, however, usually have been limited. The Japs have been known to provide no defense other than that offered by a city wall, but they generally can be expected to organize the buildings within such a wall as thoroughly as time permits, or, if no wall exists, to base their defense on the buildings alone.

In the defense of Manila, not only ancient walls—with their high resistance to artillery pounding and good strategic location—but modern buildings, too, provided the Japanese with easily adaptable and effective fortresses. U. S. forces found it



Strongpoint in NEW POLICE STATION, MANILA.

necessary to reduce most buildings to rubble, and then occupy them in order to prevent the Japanese from retaking them. The strongest defensive position, Intramuros, was surrounded by a wall 10 to 40 feet thick and honeycombed with tunnels and excavated gun emplacements. The Japanese also prepared isolated strongpoints in private homes, churches, schools, and government buildings whose construction was earthquake proof. Machine guns, antiaircraft guns, and 75-mm pieces were located inside the buildings; the antiaircraft guns were emplaced on upper floors and were depressed for ground targets. Entrances, stairways, and halls were sandbagged and reinforced to such an extent that they often withstood point-blank fire from U. S. 75- and 105-mm guns. Small rifle and machine-gun slits were chipped in walls, but in several cases these slits were found to be very narrow apertures which limited fire to a single



Pillboxes defending Manila buildings.

passageway. Barbed wire and booby traps were used liberally, both inside and outside buildings.

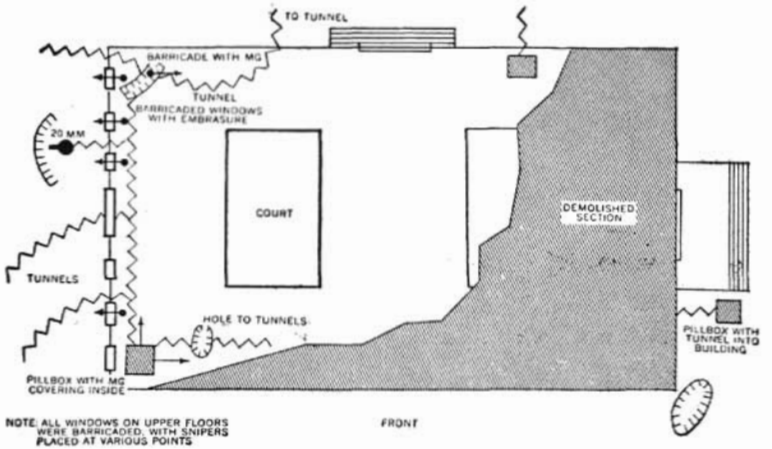
Typical of the tenacious defense of buildings in the principal city of the Philippines was the action centering around the Manila Hotel. After U. S. troops took the upper floors in an all-night battle, the enemy reoccupied the lower level. The following morning the Japs retired under pressure to a basement air-raid shelter, where approximately 200 of the enemy perished after the entrance was sealed.

The principal defenses in Japanese buildings have been on ground floors, but troops also have been deployed on upper floors and on roofs. Bombproof shelters within the buildings have been used to protect the garrison during preliminary bombing and shelling. In order to shift soldiers from one structure to another as a battle progresses, passageways between buildings have been constructed. Japanese plans contemplate that these passageways will be utilized in returning troops to a building in the event that Allied troops depart without destroying it.

Within Manila buildings, corridors were heavily barricaded with furniture. In addition, special walls arranged in staggered positions were set up inside the passageways. These walls—usually wooden forms filled with dirt—were from 3 to 4 feet thick and from 7 to 10 feet high. Enough clearance between the top of the wall and the ceiling had been left to permit grenades to be lobbed over.

FIELD FORTIFICATIONS

Japanese construction of field fortifications to aid in the defense of any city has been limited only by the time available, the troops that could be spared for the purpose, and the supplies and equipment on hand. Concrete, wood, and metal pillboxes have been of the familiar Japanese types; the thick-



Legislative Building defenses (Manila).

ness of the walls has ranged from a few inches to several feet, and inside walls have been sandbagged to reduce fragmentation within the positions. Obstacles have been placed around the positions so as to force the attackers to cross fire-swept areas and to prevent the close approach of Allied infantry and engineer assault teams.

In Manila, both covered and uncovered trenches connected pillboxes with each other and with satellite foxholes, and sometimes with buildings that the system was designed to protect. Fields of fire from the pillboxes sometimes were very limited, but generally they were incorporated into a belt of fire ensuring all-around protection of each pillbox until one or more was put out of action. Those with limited fields of fire were not in position to open fire until the attacking troops were very close, but they had the advantage of being protected from weapons in the hands of the attackers until they were at very short range.

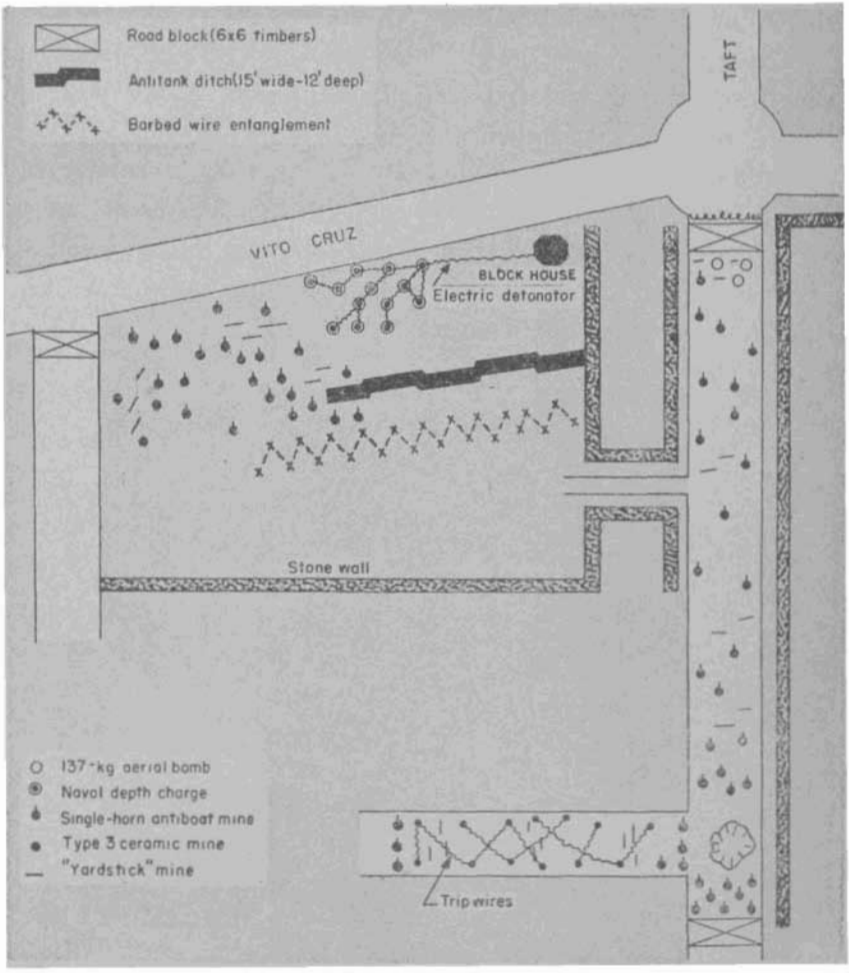
Pillboxes and other field works have been well camouflaged in rubble, which usually has been arranged to provide extra protection for these fortifications. In Manila, reinforced pill-

boxes, strategically situated to canalize assaulting troops through severely limited approaches, commanded each critical point. The Japs found destroyed areas of great value in providing material with which to conceal their positions. Debris from shattered buildings also was piled around and on top of the positions and tended to dissipate the effect of exploding shells and demolition charges.

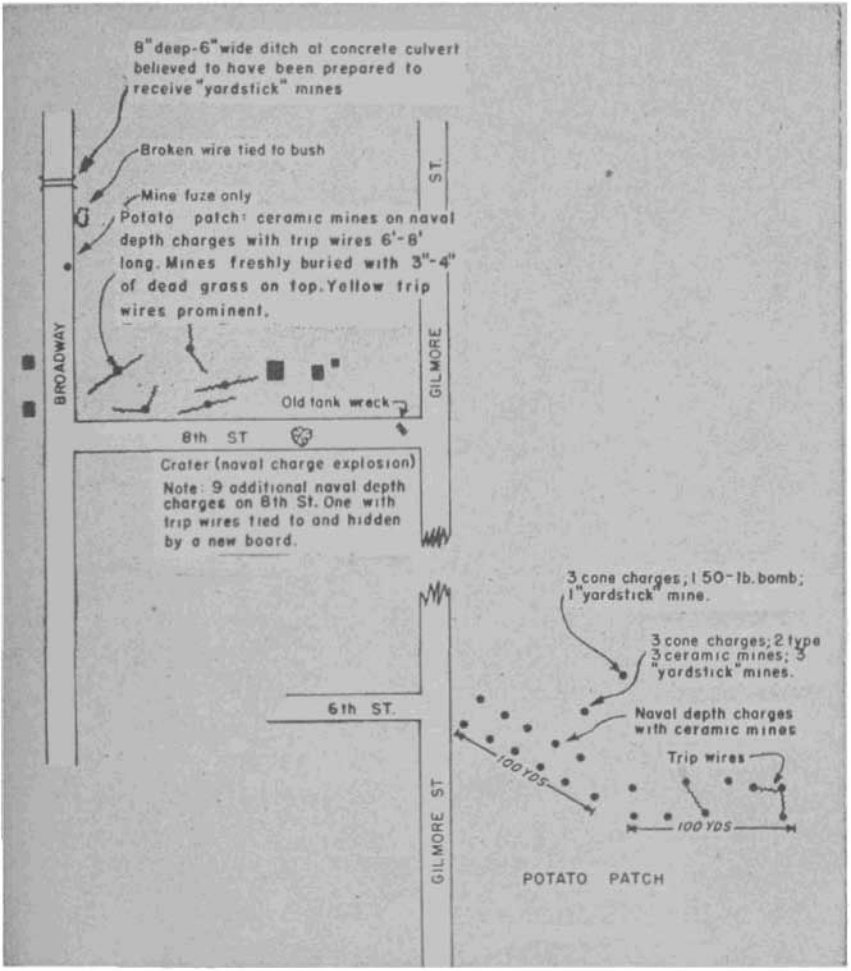
Streets usually have been blocked by all types of obstacles when time and materials have been available. Vital intersections have been barricaded, and have been covered by antitank and automatic weapons sited down all streets approaching the intersections. Streets leading to each fortified center of resistance have been organized with particular care; and minefields, barricades, and demolitions have been used to make them unsuitable as avenues of approach.

Manila barricade.

Nearly every street in Manila was barricaded with whatever materials were at hand. Steel rails, embedded in the ground, extended 6 to 8 feet above the surface and were strung with barbed wire. Fuel drums, into which rails or hardwood timbers had been placed and then packed with cement or earth,



This minefield on Vito Cruz, Manila, illustrates the tendency to mix all available types of mines.

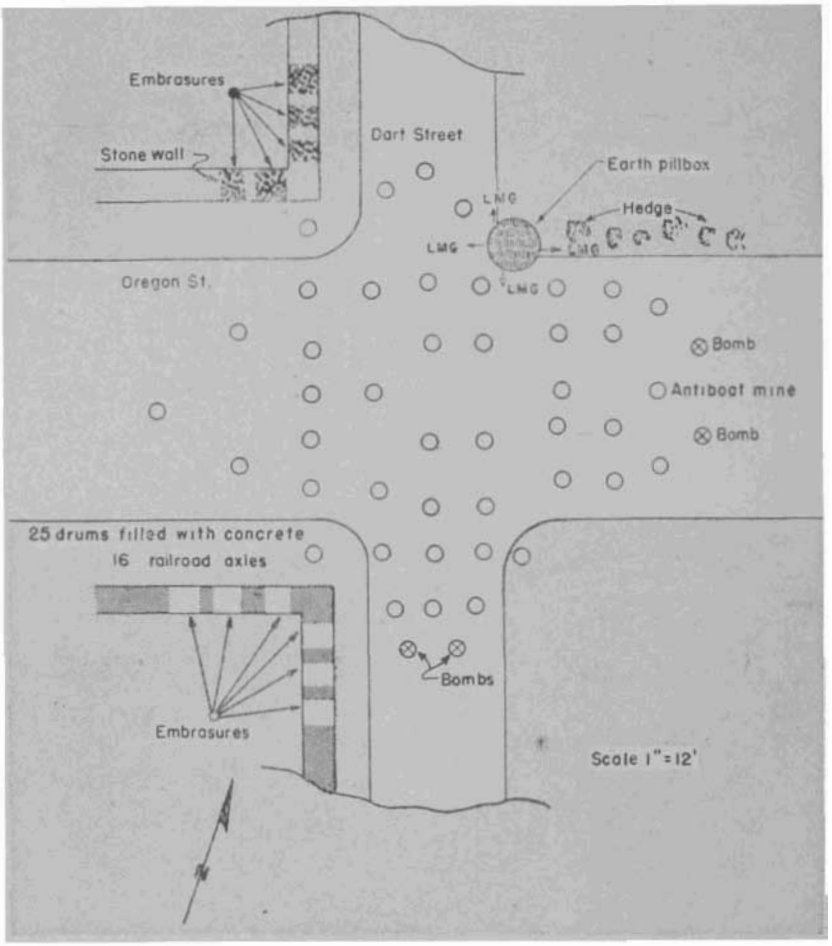


Typical minefield in the new Manila Subdivision.

were frequently encountered. Additional obstacles included railroad car axles, heavy factory machinery, and harbor buoys. Areas in front of obstacles usually were extensively mined.

ANTITANK MINEFIELDS

Since the Japs clearly realize that tanks must be prevented from delivering point-blank fire if city positions are to be held,



Typical Japanese installation for defense of a street intersection.

a growing emphasis is being placed on the siting of antitank minefields and antitank guns. Thus far the Japanese technique of antivehicular minefield warfare has been inferior to the German standard; however, the Japs are improving it, and are giving a great deal of thought to its part in the defense of cities.

The tactical siting of minefields has not been consistently effective in any type of operation, although noticeable progress is being made. Since the problem of the tactical siting of the fields is less difficult in cities or towns than in less built-up terrain, where the choice of avenues of approach is more varied, Jap use of mines in inhabited places very likely will prove to be better than in open country.

In recent operations the tactical use of minefields in urban areas has been on a large scale and has been relatively effective in delaying, if not destroying, Allied mechanized vehicles. Both uncontrolled and controlled minefields have been used in city warfare, with the two types of fields found separately or in combination. Mines usually have been poorly camouflaged, and many have been only partly buried.

In Manila, minefields thoroughly covered by fire were employed extensively. Although they often had been crudely laid and poorly camouflaged, they proved extremely hazardous and delayed U. S. troops. Antiboat mines and converted aerial bombs were the types most frequently encountered. Artillery shells, mortar shells, and depth charges wired for electrical detonation were often used as mines. Ceramic mines, laid flush with the ground were employed to detonate the depth charges, and some were rigged with trip wires. Fuel drums containing depth charges connected to ceramic mines often were used in conjunction with roadblocks.

Although minefields have been covered by fire, the positions of the covering weapons have not always been well chosen, and the defending troops often have withdrawn or have been forced to leave the positions before the minefields have been breached. While the use of regular patterns is prescribed in Japanese doctrine, few of these have been encountered.

OKINAWA AND IWO DEFENDERS WELL FED AND EQUIPPED

As Japanese forces are driven deeper into their inner zone of defense, the shortening of enemy supply lines facilitates the issue of new items of equipment. In contrast to the situation in Burma, where for almost a year the deterioration of Japanese quartermaster supply has been increasingly evident, enemy troops on Iwo Jima and Okinawa were both well equipped and well fed. Practically all Japanese Army personnel on both islands had been issued new clothing and equipment, and the elaborate cave systems had been used to advantage in massing different types of supplies.

READY FOR OKINAWA WEATHER

In preparation for the cold nights on Okinawa, enemy troops had been issued warm clothes and a generous supply of blankets. Cotton khaki trousers lined with jersey with the nap turned inward were observed on enemy dead and at several supply points. The issue of these well-made trousers indicates that the enemy anticipated and provided protection against the extremely cool nights.

Significantly, the Jap soldier went into battle wearing a complete outfit, including undershirt, drawers, shirt, blouse, and trousers. His officers frequently wore leather puttees over spiral wrap leggings. The split-toed, rubber-soled shoe appeared to be the preferred footwear for officers as well as enlisted men.

On Okinawa, standard Japanese field rations were found in the usual tin containers enclosed in wooden crates.[1] These rations included 5-ounce cans of "cow meat"; dried soy-bean powder in 1-pound paper bags, with 24 bags to a tin; hardtack in colored silk bags (in place of cotton bags), with 36 bags to the tin; and canned mackerel and tuna. There was also canned heat and 5- and 10-gallon kegs of soybean sauce, soybean paste, plums, and tuna, while rice was available in ample quantities. Moreover, the Japanese Army had forced natives to sell livestock and garden produce at one-third the normal market price.

Several crudely constructed stone and clay fireplaces were observed by members of a U. S. Quartermaster Intelligence team. The tops of the fireplaces had circular openings, approximately 30 inches in diameter, to accommodate iron rice pots. Numerous meat cans, tied together in lots of 10 to 15, were found in the immediate vicinity of the ranges. Apparently the meat cans were filled with hot foods at this point, and were carried to forward positions for distribution.

Gasoline dumps on Okinawa were well dispersed in cleverly camouflaged revetments in the sides of hills. Each revetment contained approximately thirty 55-gallon drums, and at each entrance a placard indicated the number of the revetment and the type of fuel stored.

OKINAWA REPAIR INSTALLATION

A Quartermaster Intelligence team operating with the U. S. Tenth Army on Okinawa reported the existence of a Japanese clothing and equipment repair shop in one of the caves. Normally, each Jap soldier is provided with needles and thread, and is required to do whatever mending is necessary to keep his clothing and equipment in usable condition. This shop, however, had been set up well forward of the en-

[1] See INTELLIGENCE BULLETIN, Vol. III, No. 2, for a description of both field and combat rations.

emy main line of defense to repair clothes, helmets, blankets, haversacks, mosquito bars, raincoats, and shoes. The equipment of the clothing repair section of the shop consisted of two or three very old Singer sewing machines, flax thread, pre-cut patches, rolls of mending tape, and metal and wood buttons.

A significant feature of the clothing repair was the almost incredible extent to which garments and shoes had been patched or mended. In many cases, the original cloth of uniforms had been entirely obliterated by darns and patches. It is not definitely known whether repaired items were reissued to line troops or to Okinawan and Korean labor troops.

FOOD SURPLUS ON IWO

Japanese Army personnel on Iwo had not only been issued new clothing and equipment, but they were healthy and obviously had not lacked food. Rice, dried vegetables (such as soybeans, carrots, seaweed, and pumpkin), hardtack with candy, noodles, and canned "cow meat and vegetables" were stored in the caves in large quantities and dispersed throughout the island.

In Iwo garrisons, troops quartered together in the same general area had a centralized mess. Their food was prepared at one location by cooks, and was ladeled into individual mess gear for the troops, who then retired to adjacent areas to eat. Company officers ate the same rations, carried to their quarters by orderlies who added special dishes if the local supply situation permitted.

The combat ration usually issued to troops consisted of three meals of uncooked rice, three bags of biscuit (or hardtack), and one can of fish or other food. If supplies were available, troops also received, during each week, 120 grams of sweets per individual, one can of fruit per 3 men, and one bottle of *sake* per 10 men.

In storing supplies on Iwo Jima, no apparent attempt was made to segregate different classes of supplies. Subsistence items, clothing, and individual equipage often were found together, generally on raised platforms. The storage caves were infested with vermin and rodents which had caused considerable damage. Caves used as troop quarters were provided with sleeping shelves, subsistence stores, and three to five large cookers inside one entrance.

CONTRAST IN BURMA

During 1945, and even before, the Jap front-line troops in North and Central Burma have rarely had clothing or equipment in good condition. Throughout the whole of the 9-month campaign from Myitkyina to Mandalay, the advancing Allied troops captured very few Japanese articles of clothing that were not at least half worn out. Enemy service shoes had worn out after 3 days of marching. Small quantities of unissued depot stocks were captured only in the fort at Mandalay, and these consisted principally of officers' clothing.

Beginning early in 1945, an increasing quantity and variety of extremely poor Japanese substitutes were captured. The worst of these was a coarse, open-weave, cotton burlap or gunny cloth. The quality of this material is so poor that adjacent threads will have a differential of 7 to 1 in size. The weave is so loose (only 13 by 19 threads per inch) that the burlap is actually supplied as mosquito netting for protection of troops at night. In order to exclude tiny sand flies, the U. S. 1944 production of netting averaged four times as close, but with threads so fine that air permeability is greatly superior. One can well imagine the Jap soldier sweltering beneath the "protection" of a burlap mosquito bar on a stifling night during the tropical monsoon.

THE JAP HOLES IN

The Japs are going underground—literally. The potency of American fire power has forced the enemy to resort to rat-hole defenses. Consequently, clever use of both natural and man-made caves has become a major development in Jap defensive tactics.

In recent months Jap commanders have made a determined and successful attempt to increase the quantity and improve the quality of cave fortifications. The Jap soldier today is facing a virtual propaganda barrage on how to counteract the innate tactical drawbacks of caves, exploit their advantages, and neutralize improved U. S. methods of dealing with them.

This increased emphasis on holing-in stems directly from the Japs' more realistic acceptance of a purely defensive role. In place of the face-saving annihilate-the-enemy-on-the-beach doctrine that they preached and followed during earlier island operations, the Japs in recent operations have attempted to exploit to the full the natural defensive features of the invaded territory.

Whether this new policy will be followed in future operations depends largely on psychological factors. If, for example, the Japanese mainland should be invaded, would the responsible Jap commanders feel compelled to launch an all-out effort against the landing to prevent the profanation of Japan's holy soil? Or would they choose to retire to more defensible positions? In any case, the campaigns on Luzon, Iwo Jima, and Okinawa give evidence that the Japs have learned, the hard way, how to prolong their resistance by developing positions affording maximum protection for their own forces and at the same time making maximum difficulty for ours.

CAVE DEFENSE TRENDS

The Japs have been holing-in since the start of the war, but

none of their early underground fortifications matches their efforts on Luzon, Iwo Jima, and Okinawa. Starting with dug-in perimeter defenses at Tarawa and developing an increasing use of natural caves on various other islands, the Japs now are not only utilizing all available natural caves but are pocking the countryside with more and more man-made diggings.

Where early in the war cave fortifications were largely last-ditch positions and shelters for hard-pressed, isolated troops, the Japs now utilize underground positions as bulwarks of their defensive systems. Caves are used not only as defensive strongpoints, but as gun emplacements, command posts, communication centers, personnel shelters, medical aid stations, and supply dumps. The caves are joined by elaborate tunnel systems that give the Japs considerable freedom of movement underground.

ADVANTAGES AND DISADVANTAGES

Soberly analyzing this type of defense during the breathing spaces between invasions, the Japs call to mind the relative advantages and disadvantages of cave position.

On the credit side, cave defenses are largely independent; they make good antitank positions; they counteract the effects of bombing and shelling and thus reduce casualties and support morale; and they facilitate gas defense if proper preparations are made. The Japs also list another advantage: caves are well suited for flexible combat. This advantage is questionable. Granted sufficient organization in depth and adequate intercommunication, cave positions are still relatively static and exclusively defensive. It is possible to retire from caves with rear exits, or to move laterally to alternate caves; but tactical mobility is definitely limited.

Disadvantages of cave positions recognized by the Japs are poor visibility and difficulty of communications; hindrances to

the sudden massing of fire power; difficulty of mounting attacks and counterattacks; and the lack of mutually supporting fire and of "direct defensive power"—a general term typical of Jap doctrinal literature which would seem to contradict the claimed advantage of flexibility.

Recent failures of Jap cave defenses may be attributed, according to their own admission, partly to the improvement of U. S. tactics, but also to a laxity on the part of the defenders in needlessly exposing small-arms ports and gun embrasures to shell fire; caves were constructed in high positions, where they were easily spotted by observers; and caves were set up with a maximum of dead firing space and a minimum of shelter.

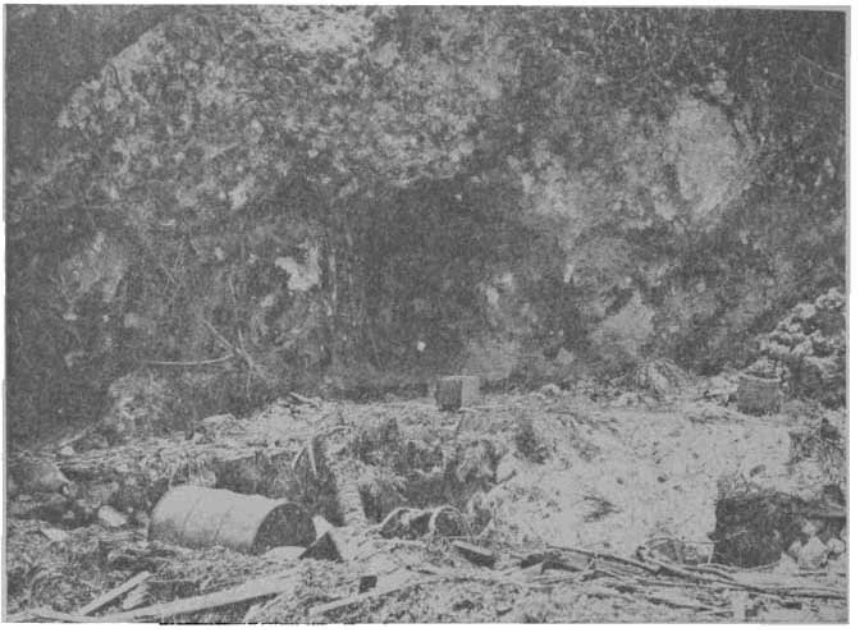
RECOMMENDED IMPROVEMENTS

Recognizing the need for improvements and countermeasures, Jap commanders have deluged their troops with instructions for the betterment of cave defenses. Recent reconmendations are as follows:

To counteract the lack of direct defensive power and absence of mutually supporting fire: Dead spaces must be eliminated and mutually supporting positions constructed. Flanking fire positions must be set up which can provide fields of fire covering the dead spaces of all caves within an area.

To overcome poor visibility and difficulty of communication: Adequate means of communication and observation are to be provided. The use of tunnels is urged for communication, and the construction of well-sited and concealed observation posts is recommended to provide good visibility.

To provide massing of fire power: Lower echelon commanders are instructed to organize bands of fire. Small-arms and artillery fire positions are to be integrated, and provisions made for the use of gun ports by more than one gun at a time.



A Japanese cave on Guam. Many of these caves and tunnels were used as weapons emplacements, but some were handicapped by blind sides, limited fields of fire, and poor siting.

To facilitate attacks or counterattacks: The construction of reserve positions is urged. Reserve troops should be held ready at all times to make attacks or counterattacks in addition to their duty of backing up the front lines.

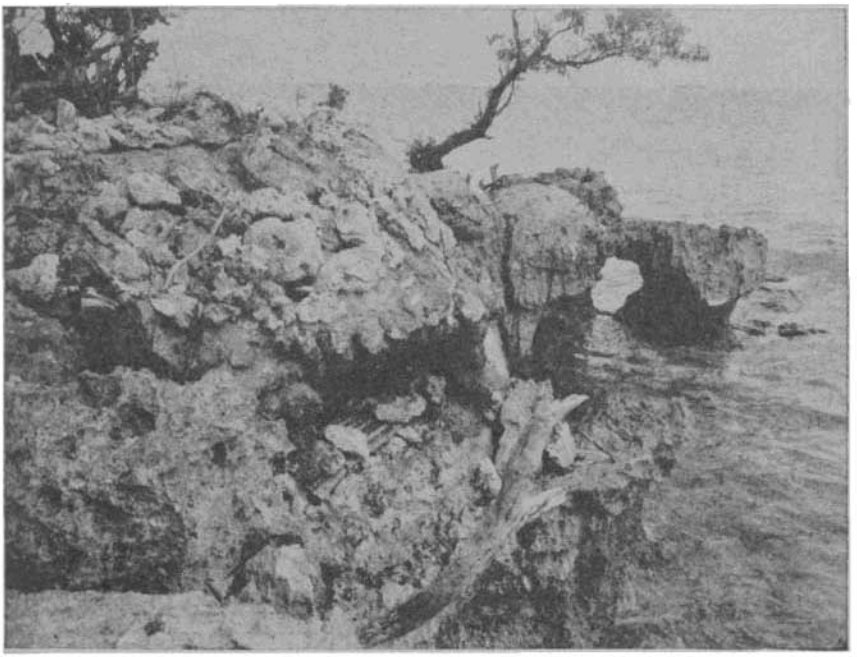
To provide shelter and eliminate exposure to shelling: Dummy positions, camouflaging of positions, and the protection of gun ports and embrasures against gunfire are necessary. Tunnels should be constructed in as many places as possible to serve a dual role as shelters and lines of communication.

To counteract U. S. tactics and defeat U. S. attacks: Caves must be constructed in depth with a wide extension of the front; "jack-in the-box" positions and small dugouts are to be scattered throughout the area to facilitate close combat; antiflame

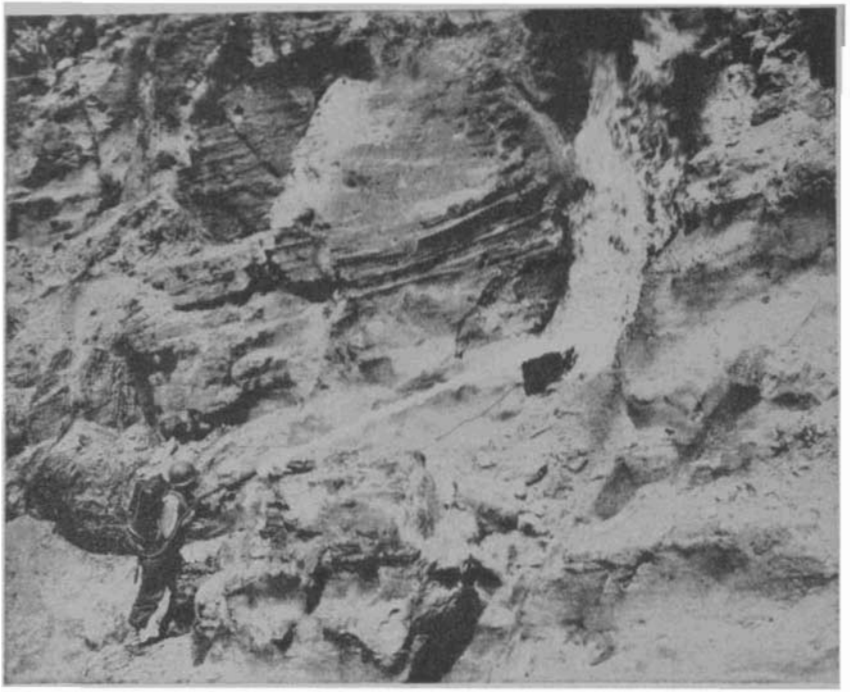
and antigas defense installations are to be established; and the mouths of caves are to be guarded by snipers, grenade dischargers, and obstacles. All troops are to be on the alert for attacks and are to take precautionary measures against U. S. attack weapons, particularly flame throwers.

CAVES ENCOUNTERED

The enemy's increased use of cave fortifications and dug-in defenses during the Pacific war is evident from a progressive study of the cave defenses encountered by U. S. forces during the major Pacific campaigns. The campaigns against Tarawa,



Most of the caves encountered on Peleliu were situated high on precipitous slopes, facing in all directions. This cave apparently was part of the beach defense system, although most of the dug-in positions on the island were built for last-ditch stands.



An Army flame thrower man advances to the mouth of a cave on Iwo Jima suspected of housing Japs. Remnants of the Iwo garrison still are being dug out of caves like this.

Makin, and Kwajalein are not included because cave defenses did not play a significant role in their defense.[1]

ATTU

The Japs appear to have recognized—to some extent, at least—the value of cave positions as early as the campaign against Attu. Natural and artificial caves were integrated in setting up defensive positions, and trenches and tunnels connected foxholes and automatic-weapons positions. The Japs used the ter-

[1] More complete information on the defenses of Attu, Biak, Saipan, Guam, Peleliu, Leyte, Luzon, Iwo Jima, and Okinawa can be found in previous issues of the INTELLIGENCE BULLETIN, TACTICAL AND TECHNICAL TRENDS, and MILITARY REPORTS.

Two Army infantrymen and a Marine move up to the flame-blackened cave mouth to deliver the clinching grenade against Japs who may still be alive inside.

rain to maximum advantage, often preparing positions in the sides of gullies.

WAKDE ISLANDS

In the Wakde Island group, just north of New Guinea, U. S. forces encountered holed-in Japs who had to be blasted out by the most expeditious method. At one point the Japs were lodged in a 30-foot tunnel in the side of a coral cliff with a stone parapet guarding the entrance, and another Jap strong-point was located in a dugout under the floor of a hut. Groups of Japs were also established in caves and connecting tunnels

in a steep coral slope which rose from the sea to a height of 50 to 75 feet immediately back of the beach.

BIAK

The use of limestone sinkholes and caves, located in coral ridges and cliffs and connected by a series of tunnels, demonstrated Jap ingenuity in exploiting the natural defensive features of Biak. Protection against bombs and shells was afforded by the deep caves and tunnels, and a strong defense was made possible by the broken nature of the surrounding terrain.

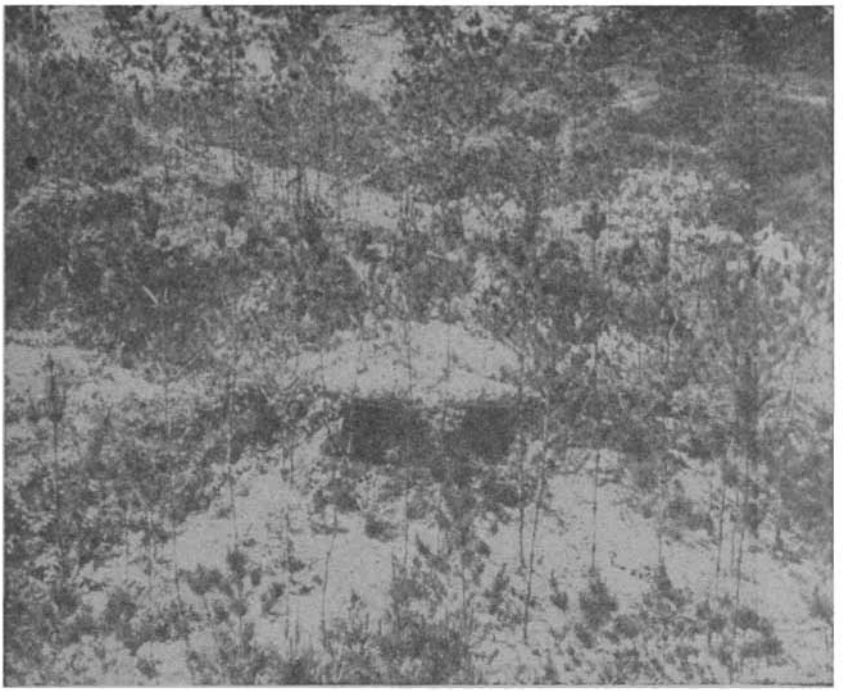
Two 50-foot-deep caves, one of them measuring about 75 feet by 200 feet across its top opening, were found in the Mokmer Pocket. The caves were located almost 200 feet up the side of a cliff and were honeycombed with tunnels and alternate passages.

The so-called West Caves consisted of three large depressions in the ground. One was almost circular, with a diameter of 75 feet and a depth of about 100 feet; the second was oval in shape, with a width of 100 feet, a length of 160 feet, and a depth of 50 feet; and the third was about 80 feet in diameter, with a maximum depth of 100 feet in some places. These holes were connected by a series of tunnels and caverns with a total shelter capacity of about 1,000 men.

The Ibdi Pocket was about 400 yards long and 250 yards wide with intervening cuts and depressions between ridges honeycombed with caves. In addition to pill-boxes, the major defenses consisted of four large and 17 medium caves and a minimum of 200 hasty emplacements.

MARIANAS

Natural or artificial caves on the faces of cliffs and some concrete and earth-and-log type dugouts formed the major part of what few inland defenses there were on Saipan. Many of



Twin entrances to a Japanese cave on Okinawa. Most of the caves were constructed in the steep hills and bordering streams.

these cave positions were inaccessible because of their defile-like approaches, and many others were extensive in depth and contained foxholes and barriers within them. About 200 Japs were found in one cave which had two openings.

Strongly organized and defended cave positions were also found in several places on Guam. One support position, consisting of well-defended caves connected by tunnels, was defended by a wide variety of weapons. Gun positions, dug into the sides of hills and reinforced by concrete sides and roofs, were connected by tunnels which also served as shelters for personnel. Natural caves and man-made tunnels were utilized as weapons emplacements at times, but many of them had

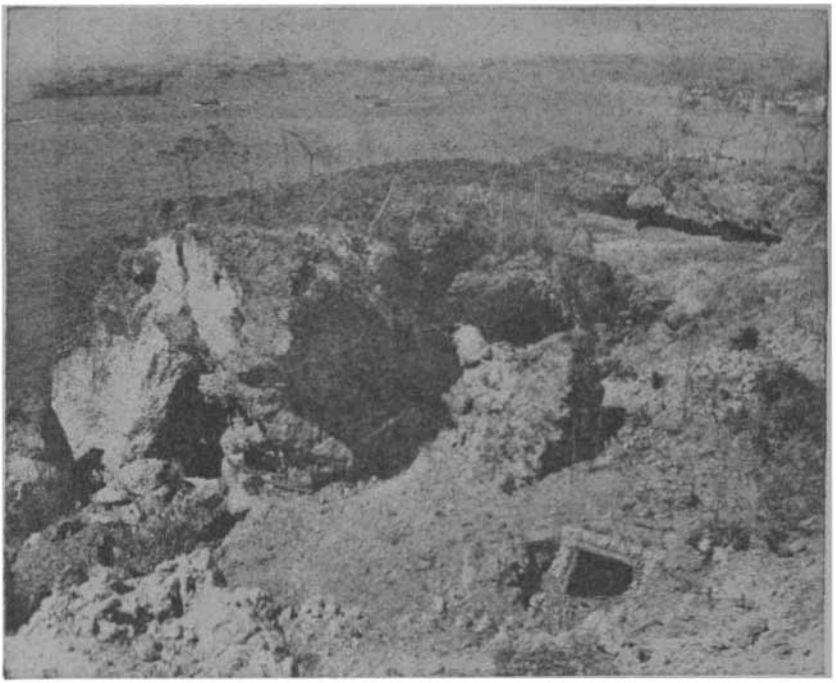
The extent to which the terrain was honeycombed with caves on Okinawa may be seen in this view facing toward Conical Hill (right center).

blind sides, some had limited fields of fire, and others were poorly sited.

PALAUS

The caves on Peleliu were the most extensive encountered up to that time and the Japanese utilized them to the utmost as last-ditch defenses. Most of these caves were natural formations of limestone, and some were improved by cutting fire ports, constructing alternate entrances, and bracing the walls with coral and concrete.

After losing the battle on the beaches, the Japs withdrew to terrain honeycombed with caves and containing several excellent observation posts. Situated high on the sides of the cliffs or precipitous slopes, the caves faced in all directions,



Natural caves in cliffs on Okinawa were used as strongpoints by the Japs.

were on different levels, and were frequently reinforced with concrete and steel doors covering practically invisible entrances. Often they were provided with many chambers and multiple entrances, and they were so stocked and located as to be self-supporting as well as mutually supporting.

Defenses on Angaur consisted in part of a series of connected compartments extending to a depth of 50 to 60 feet. The compartments, each about 10 feet square, were staggered and constructed on successive levels, somewhat like staircases.

LEYTE

On Leyte, dug-in positions were used extensively, as was exemplified in the attack on Dagami, which was hindered by the extremely rugged terrain where the Japs dug themselves

in among caves and boulders in commanding positions. One of the ridges attacked was honeycombed with deep caves on the reverse slopes, and another assault revealed pillbox caves extremely well camouflaged.

There were over 30 pillboxes in another position, 10 of which covered the rear. They had been dug into the base of trees with openings all the way around and tunnelled from one to another. The principal fortifications consisted of foxholes connected by trenches, pillboxes, and tunnel-connected caves.

LUZON

The Jap fortifications in the Bamban-Stotsenburg hills were described as one of the most elaborate and extensive systems of cave and tunnel defenses encountered in the Southwest Pacific. Ideally suited for defense, the terrain consisted of a series of steep ridges and deep ravines. Gun positions were mutually supporting and covered avenues of approach that generally afforded little cover or concealment for attacking U. S. forces.

On Storm King Mountain a 1,000-foot ridge covered with heavy timber, cane brake, and undergrowth was defended by fire from automatic weapons and grenades which rendered approaches almost impossible. The location of concealed positions could be discovered only at close range, while caves and tunnels were mutually supporting and were given further protection by fire from guns dug in on high ground at the rear and flanks.

U. S. forces also encountered an elaborate system of defenses in the foothills of the Zambales Mountains, where the hills were literally honeycombed with tunnels, pillboxes and gun emplacements. The Japs were careful to utilize all key terrain features and took full advantage of the horseshoe and razorback ridges interspersed with rolling grassy slopes and heavily

wooded ravines. Ample supplies of food and ammunition were found in the tunnels, which contained lateral compartments for the protection of personnel against bombings and direct artillery fire. The tunnels, trenches, and gun positions were connected with fairly well-hidden foot trails; in addition, a system of roadways connected these positions with similar ones deeper in the foothills and assured the enemy of an avenue of approach or withdrawal.

IWO JIMA

Work on the elaborate system of defenses on Iwo was begun soon after the fall of Saipan when fortification engineers, including cave specialists, came from Japan and drew up specifications for the construction of the caves that constituted the backbone of the defensive system.

This is the rear entrance or exit for one of the strong gun emplacements used by the Japs on Okinawa.

A well-concealed tunnel on Okinawa. Note the communications trench in the foreground.

So planned that frontal shelling could not hit apertures directly, the caves varied in size from those with a capacity for only a few men to some large enough to accommodate 300 to 400 persons. Most of them were built with multiple entrances to permit escape, and almost all were stocked with food and water.

The Japs improved on existing caves in rugged and rocky terrain, and also constructed new caves in the walls and sides of mountains, volcanoes, and hills. Man-made caves were 30 to 40 feet deep, and were complete with stairways, interlacing corridors, and passageways. In one area, measuring 400 by 500 yards, more than 100 of these caves were prepared. Clever use was also made of spider-trap foxholes.

In general, Jap tactics consisted of remaining underground during barrages and then coming to the surface to fire on advancing troops. When the attackers had been pinned down temporarily, most of the men were withdrawn through underground tunnels, leaving only a few gunners behind. When U. S. forces captured the position, they found only a few dead Japs, the remainder of the garrison having retired to another cave to repeat the process. Even now on Iwo Jima scattered enemy elements continue to exist in caves throughout the island, where they must be individually liquidated.

OKINAWA

Okinawa's main defenses were underground. Within the defensive belt on the southern part of the island, the Japs organized the combination pillbox-cave type of defense, supported by foxholes linked by communications trenches. Weapons were sited at the entrances of caves, which were usually blasted out of rock on either forward or reverse slopes and which were generally improved by camouflaging entrances with natural vegetation.

Many of the caves, with which the island abounds and where the enemy took shelter, were located in the steep hills and bordering on streams with 3- by 5-foot apertures. Hills were well tunnelled with the mouths of the caves as openings. The Japs stayed in the caves by day, and at night pushed their guns to the mouths of the caves to fire.

Approximately 900 caves were found in one area alone. Defensive positions consisted of caves and tunnels dug into the sides of hill masses at different levels, and the tunnels were sometimes 100 to 200 feet long.

In another sector on the island U. S. troops discovered a cave equipped with electric lights and running water. This cave had concrete apertures and firing ports.

Many of the caves encountered were reported to be booby-trapped with trip wires attached to Bangalore torpedoes, and others were equipped with rail tracks. Four such caves, 8 feet high and 9 feet wide, were dug into a prominent landmark with their entrances sited near a river. Enemy sources indicated that the caves and their tunnels could accommodate hundreds of troops, perhaps thousands.

Because the Okinawa terrain was so well suited for antitank defense, the Japs improved on the open or built-up covered positions of the kind that were found on Iwo Jima. Many tunnels, placed to cover likely tank approaches, were dug into the hills where they would provide adequate protection from light artillery.

These tunnels were so located that fire could be delivered on the rear and flanks of U. S. tanks. They were dug straight back into the hills for about 20 feet, then branched off to one side at an angle of about 45 degrees. Some had two or three firing ports leading out from the tunnel, giving the gun a much larger field of fire.

The extent to which the Japs honeycombed the hills with interconnecting defenses is best illustrated by a report of a smoke shell fired into one of the holes on an Okinawan ridge. Its smoke seeped out of no less than 40 other holes.

JAP AIR TACTICS AT OKINAWA

Despite the large number of suicide attacks against land, sea, and air targets, the Japanese air reaction during the early days of the Okinawa campaign revealed that the enemy still possesses sufficient aircraft and skilled personnel for conventional bombing attacks on a limited scale.[1]

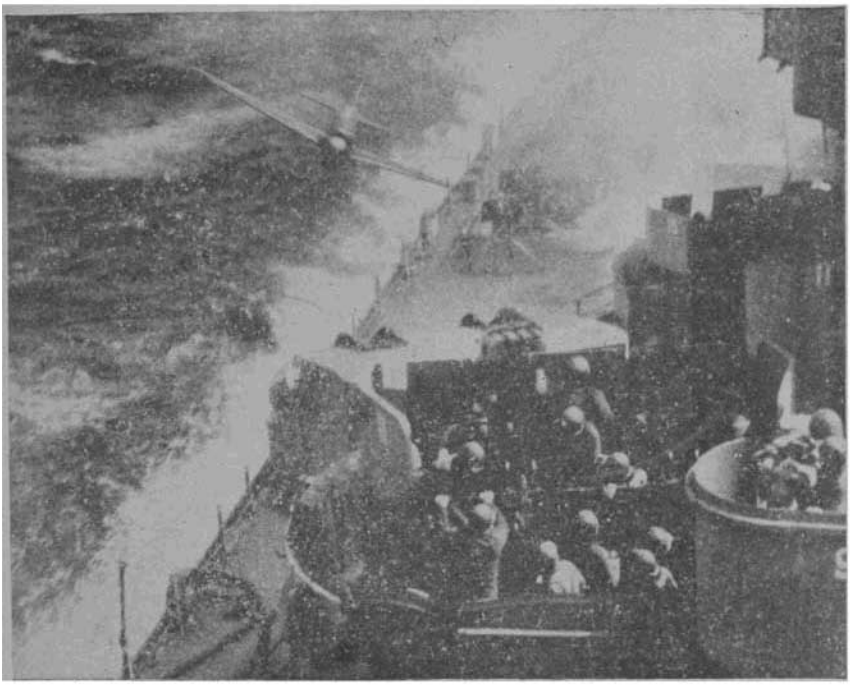
Starting with a series of single-plane bombing sorties, the Japs waited only a few days before shifting to aggressive, escorted, level bombing missions. These were followed by extensive and carefully planned suicide bombing attacks which reached a peak with the unveiling of Baka, the piloted suicide bomb.

After belated discovery of the Allied task forces approaching the Ryukyus, the Japanese maintained continuous and effective reconnaissance. The spotting was carried out by offensive-type aircraft, most of which were charged with direct missions against the Fleet, and virtually no search or float planes were sighted during the early stages of the operations.

A surprising feature of the early raids against Allied objectives was the absence of suicide crashes or rocket-bomb attacks. Tactics during this single-plane phase were as follows:

Planes—usually Bettys, Jills, and Judys—came in singly without fighter cover. The pilots, whose skilled evasive maneuvers through antiaircraft fire showed they were well seasoned, approached their targets in shallow dives, leveled off almost "on the deck", and attempted precision bombing. After dropping a single bomb each, they pulled out and headed for home.

[1] This article is based chiefly on "Jap Air Reaction to Okinawa Invasion," Hq., AAF, Intelligence Summary No. 45-9, 15 May 1945.



Suicide-bent, this pilot of a Japanese Zeke desperately tries to maneuver his plane onto the deck of a U. S. Pacific Fleet warship. The attack was unsuccessful, the plane crashing into the sea.

Only a few days later the Japs varied the pattern of single-plane attacks with an eight-plane strike. This was followed the next day by a substantial coordinated mission of more than 30 Bettys, escorted by Zekes. The attack failed notably because the escorting Zekes left the bombers to defend themselves.

Night heckling, usually by Bettys with extensive use of window, was carried out every night over a period of weeks. The window frequently was dropped just as the defensive night fighters were being vectored to the enemy aircraft.

Within the next four days, conventional methods were supplanted by the suicide attacks, with the pilots revealing little of the skill or discrimination of those of the level bombers.

The intensity of attacks varied from day to day, but suicide missions made up a major part of the strikes.

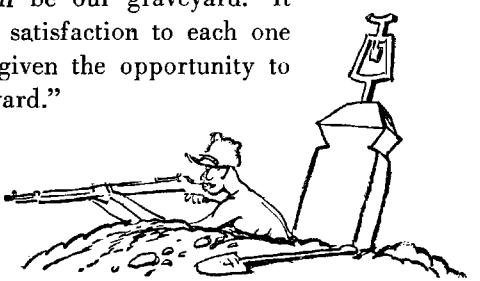
The teamwork among raiders was the most notable innovation in suicide tactics. A number of planes, acting as decoys in different directions, attempted to divert antiaircraft fire and fighter attention with fairly high, agile maneuvers at the edge of the 40-mm antiaircraft range. At the same time, the suicide planes came in low, directly at their targets.

Attacks on land targets followed the usual Jap routine, consisting mainly of night harassing missions and raids against airfields. Suicide operations, however, were also carried out against land targets, in the form of attempts to land planes loaded with saboteurs on Allied-held airfields. Jap planes were also reported to be transporting supplies to the Okinawa defenders.

Dual Purpose Foxholes

A Jap commander on Jolo Island in the Philippines, seeing that the jig was up, addressed his men:

"Jolo Island will be our graveyard. It should be of great satisfaction to each one of you that he is given the opportunity to fight on his graveyard."



JAP WEATHER

FOR SEPTEMBER

American forces will find little comfort in the fact that the most typical factor of the September climate of Japan is the abundance of rainfall. The Japanese, however, will no doubt take the opposite point of view if there are enough inflammable areas left by that time to be hit by Superforts.

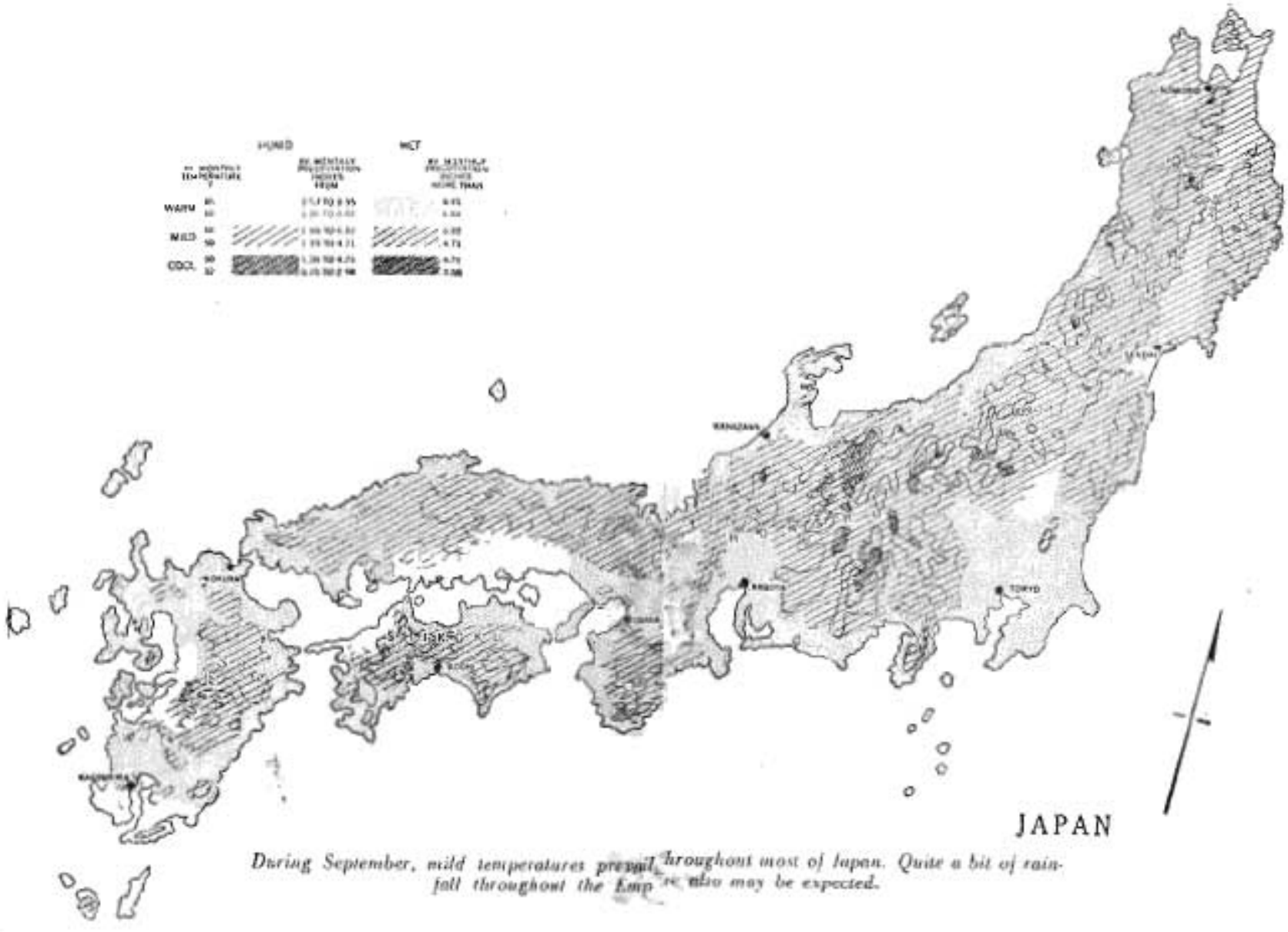
Except for the Inland Sea area (6 to 7 inches) and Hokkaido (4 to 5 inches), the rainfall in Japan during September is generally above 8 inches, the wettest spot being the south coast of Shikoku (Kochi, 16 inches). Typhoon control is partly responsible for the plentiful precipitation.

On Formosa the rainfall varies from about 2 inches (Hokko) to 35 inches (Naiinzan). The east side of the central mountain range is the wettest part of the island during the month, while the west coast is the driest.

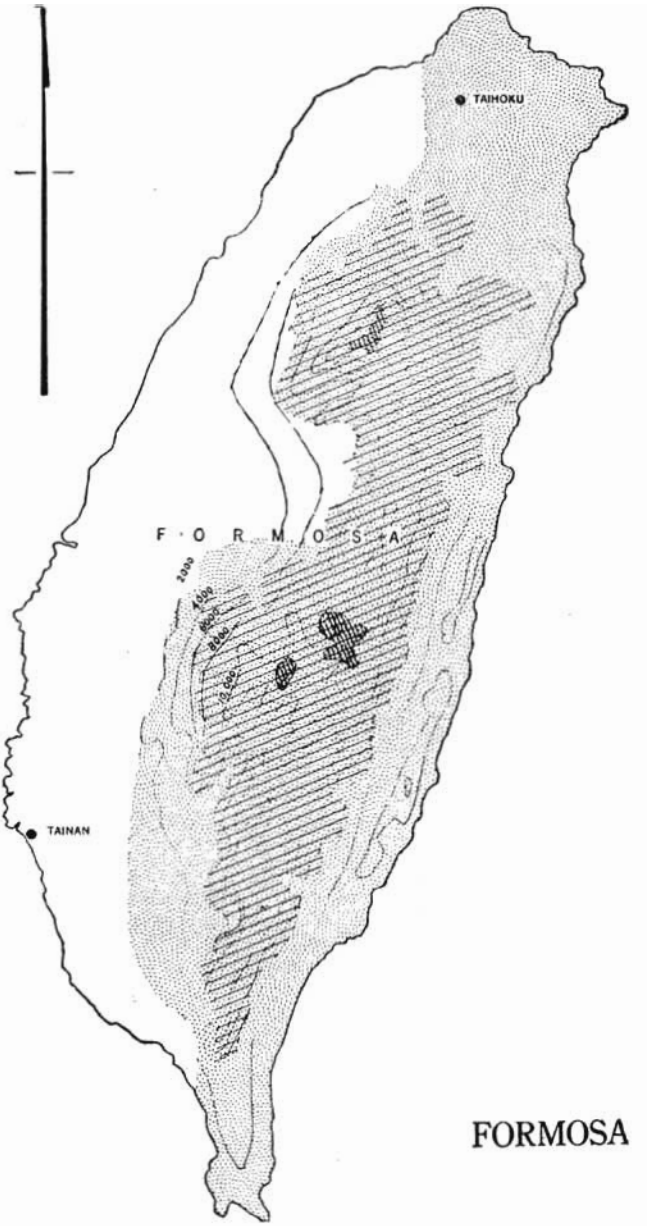
Mean relative humidity over practically all of Japan varies from 75 to 85 percent during September, and average temperatures vary from 56° F. (Syana) in the Kurile Islands and Hokkaido to 80° on Formosa.

Average day temperatures vary from about 63° F. in the Kurile Islands and 66° in Hokkaido to 88° on Formosa, while average night temperatures range from about 49° in Hokkaido to 75° on Formosa. Average temperatures above 77° F. do not occur on the main islands of Japan but are typical of the Ryukyus (Naha, 80°) and Formosa.

Only in the Kurile Islands, the Ryukyu Islands, and on Formosa is the climate during September comparable to any part of North America. The rest of Japan has, in general, a much wetter climate.



During September, mild temperatures prevail throughout most of Japan. Quite a bit of rainfall throughout the Empire also may be expected.



Rainfall will be heaviest in the mountainous areas of Formosa during September. For key to the map, see the map on pages 68 and 69.

Weather in the Kurile Islands is identical with that of Newfoundland (temperature of 55°, rainfall of 4 inches), while the Ryukyu Islands and Formosa have weather comparable to that of Miami (81° and 8.9 inches). Northern Hokkaido compares with Portland, Maine, in temperature but is about twice as wet; Tokyo and Washington, D. C., have about the same temperature, but Tokyo has three times as much rainfall.

Comparison with the climate of Europe is even more difficult. Hokkaido is similar to northwestern Spain (59° F. and 6 inches). The temperature for Tokyo is identical with that for Genoa, Italy, but rainfall is twice as heavy in the Japanese capital.

Slick Tricks on Okinawa

The Nips are still at it. On Okinawa they tried to get away with some of the same old gags:

A field telephone in a cave was booby-trapped with a single-horn antiboat mine. The mine was set to explode when the phone was cranked. Many other caves were reported booby-trapped with bangalore torpedoes fixed with trip wires. As usual, many Jap dead were reported booby-trapped, the helmet on the corpse being the favorite place to plant the booby charge.

And in Naha city, U. S. troops were "engaged" by two uniformed women armed with rifles and grenades.

Tank Warfare on Luzon

Instructions to a Jap Armored Division

"The Philippines battle has but two alternatives: for the Americans to be annihilated, or for all the Japanese forces, officers and men alike, to die in the attempt. Such an honorable death may be the ultimate goal; but no man should sacrifice himself until he has destroyed ten of the enemy." After hearing this pep talk, the soldiers of the Japanese 2d Armored Division received their instructions for combat shortly before they engaged troops of the U.S. Sixth Army in the central plain of Luzon. These instructions, which supposedly outlined "the basic principles for wiping out the American devils", are reprinted here with pertinent comments by the Sixth Army G-2.

GENERAL RULES

"This is an antitank war—a battle against heavy tanks, especially. Any lack of equipment must be compensated for by the skill derived from long training and by our superiority in diversionary surprise plans.

"The main point in antitank combat is to know the weak

points of hostile tanks, and then to exploit these weaknesses in sudden surprise attacks.

"Skillful planning can put hostile tanks at a disadvantage and create an excellent opportunity for a surprise attack. Trenches and camouflaged positions can be used to prevent detection, and enemy attention may be diverted to objects, movements, smoke, or explosions in other sectors. Japanese officers and men must at all times be proficient in the use of such surprise tactics.

"Our tank-destroying weapons are the Type 90 field gun and the hollow-charge shaped explosive with attached handle (known as 'hollow-charge explosive') which have their maximum destructive effect within 500 meters and 2 meters, respectively."

Comment: The Type 90 75-mm gun, with muzzle brake, is an effective antitank weapon, and the Japanese have employed them at much closer point-blank ranges than 500 meters. Several of our M-4's have been knocked out by Jap artillery within 150 to 200 yards range; a favorite enemy tactic has been to site the pieces along roads, permit our tanks to pass, and then fire at their rear. Hollow-charge explosives—such as the lunge mine, shoulder-pack antitank mine, and so on—have been used in a few instances, but not effectively.

"In contrast to the above, the weapons listed below are known as 'surprise tactics weapons' (*Kisakukaki*). Since these weapons are highly mobile, can use terrain features readily, and can reduce mobility and fire power of U. S. tanks through sudden attacks, they can thus facilitate the attacks made by the tank-destroying weapons. The *Kisakukaki* are effective within the following approximate ranges:

"47-mm gun	1,500 meters
"37-mm gun	1,000 meters
"Machine guns	300 meters"

Comment: The 47-mm antitank gun, Type 1 (1941), has been employed effectively, but at shorter ranges than the 1,500 meters indicated above. The Jap 37-mm gun and the Jap machine guns are not considered effective weapons against our medium tanks. It seems incongruous that the enemy should prescribe use of the 37- and 47-mm guns at longer ranges than the more effective Type 90 75-mm gun.

"It takes exceptional skill for the gunners to destroy U. S. tanks completely. Without exception, officers and men alike must become proficient in handling explosives, especially hollow-charge explosives.

"To bring the tank-destroying weapons into range before the enemy can damage them is the prime consideration. This can be done by ambush, by seizing the right moment to attack during a tank advance, or by diverting the enemy through use of a surprise plan. In such a plan, smoke, faked explosions, dummy men, and the like can be used on one side to distract the enemy's attention so that a close approach from other quarters may rapidly be made. Both the diversionary attack and the main assault should be very closely integrated and greatest precautions taken to maintain communication and liaison between them.

"In attacking with the tank-destroying weapons, the first attempt must produce direct hits. Wait fearlessly and patiently for the range to close. Keep under cover, expose positions only long enough to fire carefully, and then disappear before the enemy can take aim.

"Earthworks are equivalent to countless allies in fighting against the 'American devils', for it is fortifications that protect troops from the effects of intense cannonading and bombardment. Officers and men must make thorough use of them."

A favorite enemy tactic has been to site the pieces along roads, permit our tanks to pass, and then fire at their rear.

OPERATIONS

"American guerrillas may lie hidden in villages along our routes of operations, waiting to destroy bridges. Because of this, and because of persistent enemy air strafing and bombing, construction units must stock repair equipment and materials near the main bridges. Each force must station some men to counter guerrilla raids at important points, especially at the principal bridges. When their repairs are completed, these men should maintain proper liaison from hidden observation posts a short distance away."

COMBAT IN RUGGED TERRAIN

"Losses from American sea and air bombardment can be held to a minimum in rugged and uneven terrain. Each company should construct easily camouflaged positions, and prevent enemy observation by quick rat-like movements from place to place.

"Against enemy bridgeheads in such terrain, dismounted

soldiers are to cut through the front lines, rally, and destroy the enemy's command and fire power organization (a tactic called *Shuryoku Sento,* or a 'main strength engagement'). A special tank combat team (*Sensha Sento Gun*), composed of combined arms having a tank platoon as its nucleus, may also cooperate with the raid conducted by the dismounted troops. The whole operation will be known as a 'raid engagement' (*Teishin Sento*).

"A 'main strength engagement' is best carried out at dawn, dusk, or by daylight, with tanks, artillery, infantry, and engineers all cooperating against the hostile tanks as the primary assault targets."

Comment: Note that the enemy's conception of "main strength combat" involves the employment of no more than a tank platoon. Nowhere in the manual does the enemy show any appreciation of modern tank doctrine of employment in mass; he is apparently content to dissipate his armored strength in piecemeal attacks involving a few tanks at a time.

"A 'raid engagement' (*Teishin Sento*) is best carried out at night, with tanks and their attached infantry striking at fixed targets (airfields, warehouses, tents, and so on), and with infantry and engineers striking at mobile targets (such as artillery, tanks, and headquarters units on the move.)"

Comment: The heavy counterattack at San Manuel during the night of 27-28 January featured Jap infantry riding into combat on tanks. The extreme difficulty of coordinating tank maneuvers at night are obvious, especially in view of the usual lack of radio intercommunication on Jap tanks; yet the enemy persists in employing armor as well as infantry in his night attacks—his favorite time for fighting.

ARMORED COMMUNICATIONS

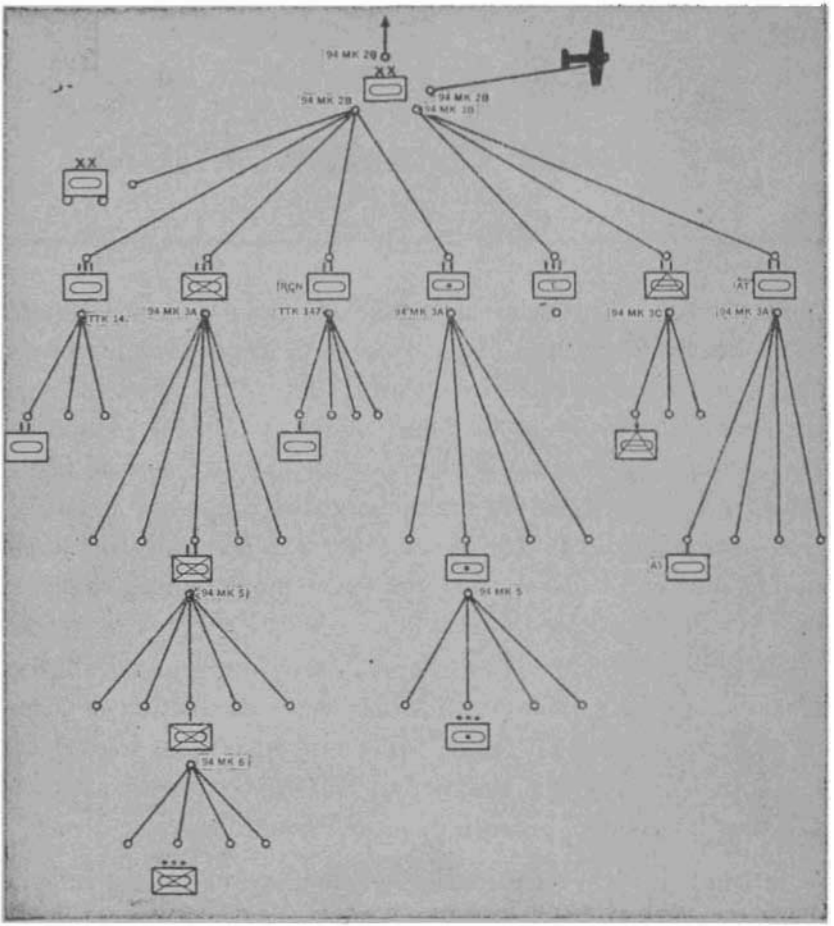
How well is Jap armor equipped for radio communication? Very meagerly, was the Allied view until the destruction of the Japanese 2d Armored Division on Luzon. A study of the communications network of that unit indicates that the amount of radio in the Jap armored division, while less than that of Allied units, is adequate for the maintenance of command and cohesion during combat. The sets in use are generally of sound design and construction, and the more modern ones stack up well beside Allied equipment.

Natural developments to expect in the future are the fitting of radios to all Jap light tanks, and the introduction of intercommunication for all tanks. It would also seem logical for the Japs to reduce the number of different types of sets, but this may be delayed because of production difficulties.

Japanese sets that are considered standard at present include Type 94 (1934) Mark 2B, Type 94 Mark 3A, Type 94 Mark 3B, Type 94 Mark 3C, Type 94 Mark 4A, Type 94 Mark 4B, Type 94 Mark 4C, Type 94 Mark 5, Type 94 Mark 6,[1] Type 96 (1936) Mark 2E, Type 96 Mark 4E, TM 305 (Model C Mark 1 Mobile Radio), TM 306 (Model C Mark 2 Mobile Radio), TTK 147 (Model B Mobile Radio), and Type 142 (Model A Mobile Radio).[2]

[1] See p. 25 of this issue for a comparison of the Type 94 Mark 6 with the SCR-610 and SCR 608.

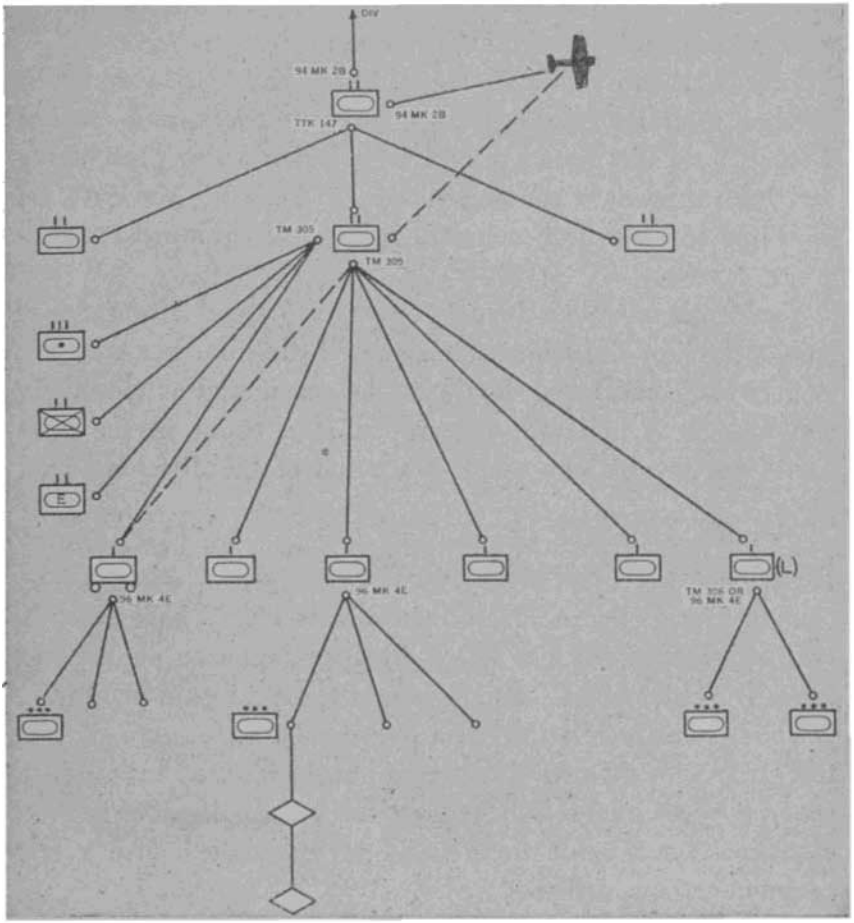
[2] For characteristics of these radios and their performance data, see TACTICAL AND TECHNICAL TRENDS, No. 58.



The communications net of a Japanese armored division.

In general, the frequencies of these many types of sets in use overlap only between 4.0 and 5.0 Mc. and therefore most nets will work within this band width. The only sets that cannot use such frequencies are TM 305, TM 306, and Type 94 Mark 6, which have a higher frequency range of between 20.0 and 30.0 Mc.

All the medium tanks examined on Luzon, which were Type



The communications system from a Japanese armored division headquarters down to individual tanks.

97 (1937) and Type 97 improved, contained radio sets. In most cases the set was the Type 96 Mark 4E, although some of the tanks were fitted with Type 142, TTK 147, TM 305, or TM 306.

Not all the light tanks, which were mostly Type 95 (1935), were equipped with radios, but those which were had either Type 96 Mark 4E or TM 306. It is not known what proportion

are fitted with radios, but the distribution appears to be confined to platoon leaders' tanks at present.

In addition to radios in the tanks, TTK 147 sets were discovered in two Type 98 (1938) prime movers, and another TTK 147 set was found in a civilian sedan which presumably had been used as a command car. A Type 96 Mark 4E set appeared to have been mounted in a truck equipped for ordnance repairs.

The communications layouts on pages 78 and 79 are based on the T/O of the triangular armored division, but they are largely conjectural and should not be considered as absolutely correct. It is believed, however, that changes in the T/O would not involve any major alteration of the division signal plan.

AMPHIBIOUS TANK COMMUNICATIONS

Both visual and radio communications means have recently been discovered for the relatively new Japanese amphibious tank. The chief visual method is said to be a visual blinker.

The blinker is described as a lightweight, self-contained electric lamp with a fairly directional beam produced by a 3-inch concave glass mirror silvered on the back. In addition, an extension-type trouble lamp has been mentioned as a visual communications method.

Similar to the U. S. SCR-284, the radio for the amphibious tank is designated as the Mobile Special Use Radio, Revision 1. Its chief characteristics are as follows:

Type of emission—CW, voice; range—unknown; frequency range—(receiver) 5-14 Mc, (transmitter) 4-13 Mc; circuit and tubes—(receiver) Superhet, 7-Ut 6C6, Ut 6B7, (transmitter) MOPA 3-P503A; power source—dynamotor battery; power output—20 watts; antenna—whip; dimensions—16 x 22 x 14½ inches; weight (set only) 80 pounds.

JAP RAILWAY PROCEDURES

Key to Burma Supply

In view of the overwhelming importance of the Burma railway system to the Japanese, it is not surprising that the enemy utilized all available means to protect it from the incessant Allied air attacks of the past year. Two of the most effective methods employed were operation of trains at night and speedy repair of bombed-out bridges.

During the entire Burma campaign the Japanese were forced to rely largely on railway transportation because of a shortage of motor transport and the fact that many of the Burma roads were not capable of carrying heavy traffic. The situation became so critical early in 1945 that nearly all enemy troops, supplies, and equipment were transported by rail.

RAILWAY OPERATING PROCEDURE

Trains on main lines usually stopped at 0500 and were split up, the locomotive being taken to a shelter and the cars dispersed. Operating personnel and passengers slept during the day. The locomotive and cars were reassembled at sunset, and the train normally moved out between 1700 and 1830.

In most instances trains kept to strict time schedules. For example, a train left one town promptly at 1900 for 18 months, and departure was changed to 2000 only during the last 3 months before the Allies occupied the town.

One train arrived at the end of a Burma line every other night, and four locomotives were said to be in operation on this line. Two locomotives were reported operating on another

line, with trains making a complete one-way trip between 0300 and 1600.

New bypasses were noticed along another line, reported to be the main supply route for a Japanese-held area. One train left the end of the line each night at 1800, arriving at the other end at about 0200. The train going in the opposite direction normally made the trip between 0130 and 0630.

REPAIR CAPABILITIES

Repair squads of engineer troops were posted at important selected junctions along one section of railroad, and it is believed that the same system was employed at other places. As soon as a bridge or section of railroad was damaged by bombing, these troops immediately went to the spot and requisitioned the necessary number of native workers from the nearest village to repair the damage. Engineering materials were made readily available by scattering them along the railroad and at important bridges.

The enemy's energy and speed in repairing bridges and in the maintenance of through communications was a highlight of the Burma campaign. The following study of the time taken by the Japanese to repair three bridges deals with representative types—a concrete causeway, a timber trestle over water, and a timber trestle over land.

CONCRETE CAUSEWAY

Aerial photographs revealed that 180 feet of bridging, including two spans, was constructed in a week on the concrete causeway, an average of 1 foot per hour based on a 24-hour day. During the 7 days 120 feet of causeway, 17 feet wide, and two spans, 20 feet long and 40 feet long, were completed.

The causeway was constructed by building parallel concrete walls 17 feet apart and solidly filling in the space between

them. It was built through water and not on sandbanks. The two spans probably were of the plate girder type, and they apparently were necessary to allow two water channels through the causeway in the middle of the river.

TRESTLE OVER WATER

A bombing attack on the trestle over water destroyed approximately 260 feet of the bridge, of which 160 feet were over sandbanks and 100 feet over the river channel. Air photographs disclosed that the bridge was rebuilt in 11 days, an average of 1 foot per hour based on a 24-hour day.

After 7 days, 150 piles for 15 double-bent trestle piers had been sunk—50 in the river and 100 on sandbanks—and 130 feet of the superstructure had been completed. Four days later the bridge was serviceable. In these 4 days 130 feet of superstructure, including joists, bracing, decking and so on, had been constructed.

TRESTLE OVER LAND

This bridge, or viaduct, consisted of two sections, 810 feet and 300 feet long, with an embankment joining the two sections. Bombing destroyed the 300-foot section, 140 feet of embankment, and 160 feet of the 810-foot section.

It took the Japs 17 days to repair the 600 feet destroyed, an average of $1\frac{1}{2}$ feet per hour based on a 24-hour day. Although the damaged embankment was not rebuilt, 40 trestle piers were constructed over the craters during the reconstruction.

NEW JAPANESE VEHICLES

Various Types Captured Recently

Allied forces in the Philippines and Burma have encountered several more types of Japanese vehicles. The new items include a steel armored car, a concrete armored car, a full-track combat car, a wire-laying vehicle, a track and rail vehicle, a half-track personnel carrier and prime mover, and a general-purpose tractor.[1]

STEEL ARMORED CAR

Captured near Iloilo, Panay, Philippine Islands, the steel armored car is built on a 1½-ton, right-hand drive Ford truck chassis, using the original motor, drive frame, and springs. It is similar in design to other types of Japanese armored cars except that the captured vehicle had no turret.

The general armoring scheme is the use of two sheets of ¼-inch steel plate, separated by an air space. The front, rear, and both sides of the roof of the main body are angled upward at approximately 30 degrees from horizontal, with a ridge running down the center of the main body. This design probably is intended to prevent hand grenades or other explosives thrown at the car from remaining on top.

There is an escape hatch on each end of the roof, and there are three triangular firing or ventilation ports on each side of

[1] For other information on Japanese vehicles see TACTICAL AND TECHNICAL TRENDS, Nos. 53, 54, and 58.

the body. No guns are mounted in the car. The only access to the interior of the car is provided by a steel-plated door at the rear.

Japanese improvised concrete armored car.

Principal dimensions which were determined are: length, 19 feet 9 inches; height, 9 feet 2 inches; width, 7 feet 10 inches: and ground clearance, 8 inches.

CONCRETE ARMORED CAR

The concrete armored car, equipped with a turret mounting a light machine gun, was captured near Zamboanga, Mindanao, Philippine Islands. The general method of armoring is the use of an exterior surface of 3/16-inch steel plate with an interior wall of 3½ inches of concrete.

Although the use of concrete probably provides more protection than ½-inch of mild steel, it makes the armor excessively heavy.

Like the steel armored car, the concrete vehicle is built around the engine and chassis of a commercial 1½-ton Ford

V-8 truck. The tires, transmission, differential, and the chassis itself appear to be the same as those of the commercial vehicle. An escape hatch, forward of the turret, is built into the roof of the body, and doors are placed on each side and in the rear.

The turret, situated in the rear of the body, is 26 inches high, and has a base 3 feet in diameter, and is made of wood, concrete, and steel. The light machine gun has a very limited free traverse and elevation. It is possible to rotate the turret in a full circle simply by shoving it around.

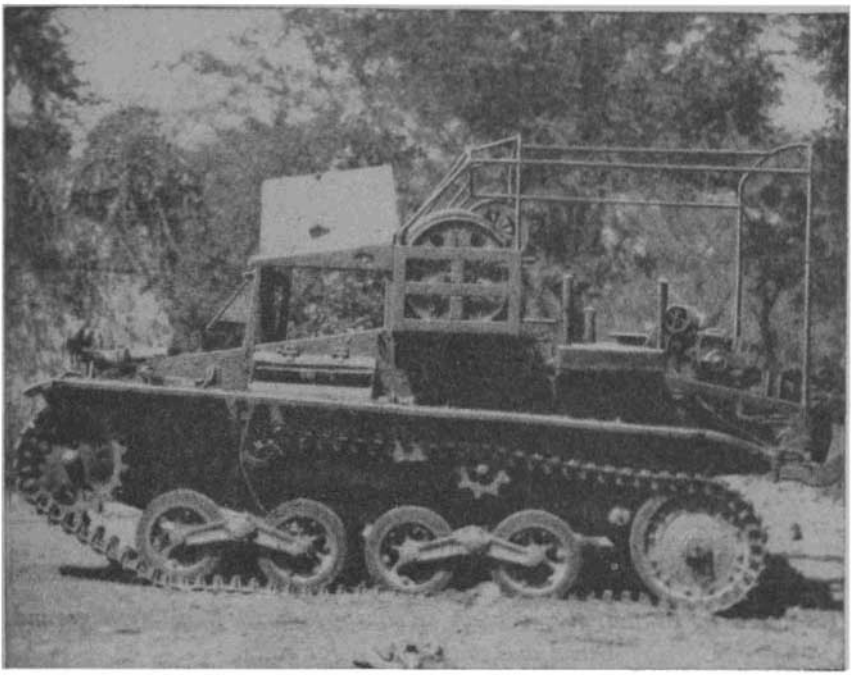
FULL-TRACK COMBAT CAR

The full-track combat car, captured on Luzon, has a suspension very similar to that of Japanese tankettes. It has a track width of 8 inches and uses center guide tracks.

Armored throughout, except for its open top, the vehicle has mounts for two machine guns and carries approximately 12 men, including the driver. The vehicle seems adapted for use as a prime mover, personnel carrier, and reconnaissance vehicle, and may be employed in light combat. Its engine is a V-8, air-cooled, valve-in-hand gasoline type.

There are rectangular compartments, probably ammunition and spare parts containers, running the full exterior length of the body, and the single rear door opens to the right side. A towing pintle, mounted on a leaf spring, is located on the rear end, and there is a fixed towing hook on the front of the vehicle. The vehicle mounts two 7.7-mm machine guns, one mount located over the engine compartment and the other at the rear of the body.

Transmission is provided with four speeds forward and one in reverse, with an additional high-low range transfer case. The suspension is of the common Japanese type, using two bogie wheels on bogie, with the bogies supported on armored coil springs by a crank type suspension. Four bogie wheels are used



Jap wire-laying vehicle captured near Mandalay.

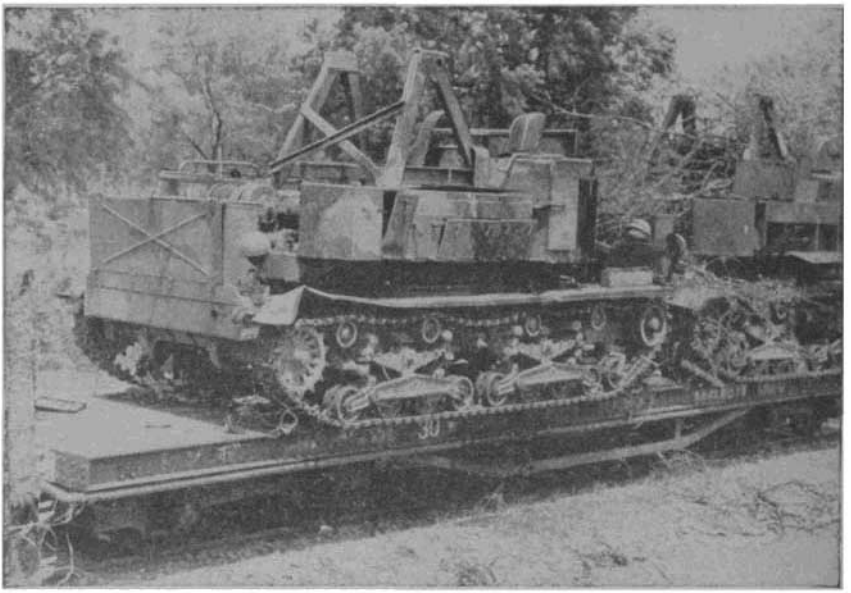
on each side of the vehicle, in addition to a large trailing idler.

Principal dimensions which were determined are: length, 12 feet 4 inches; height, 5 feet 6 inches; width, 6 feet 7 inches; ground clearance, 15 inches; width of track, 8 inches; and ground contact of tracks, 8 feet 7 inches.

WIRE-LAYING VEHICLE

Allied troops in the Mandalay, Burma, area captured an unusual piece of Japanese signal equipment—a full-track wire-laying and recovery vehicle. This vehicle is manned by a driver and four signalmen who operate the machinery which lays or recovers the wire.

The chassis design and suspension are very similar to that of Japanese tankettes. The vehicle is powered by a four-cylin-

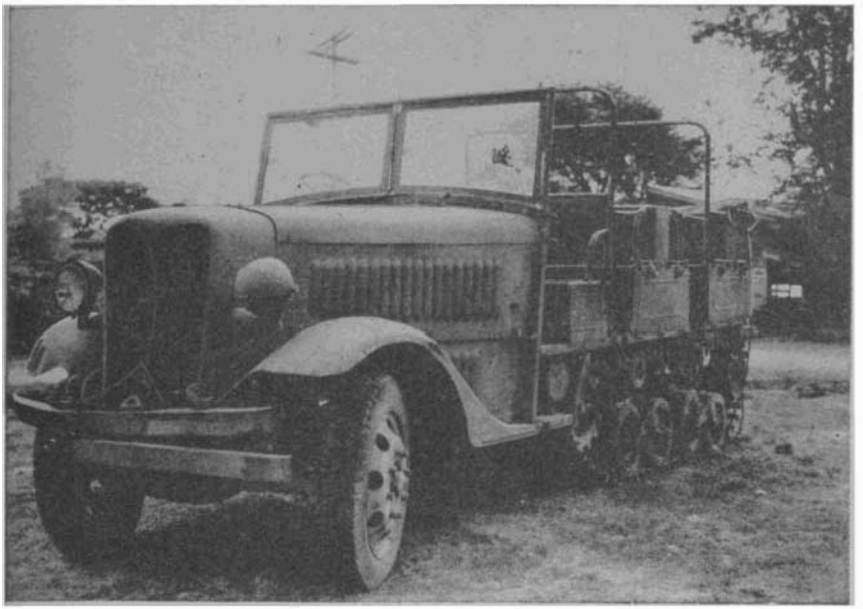


Captured in Burma, this vehicle is equipped with tracks for ground travel and with wheels for rails.

der, air-cooled gasoline engine, which is fitted with a large horizontal cooling fan. This fan, coupled directly to the front differential, sucks in air through the engine cowlings, and forces it through and around the cylinders and engine compartment.

Housed in the back of the vehicle, the wire-laying and recovery machinery consists of a reel shaft connected directly by a chain through a clutch linkage to a horizontal shaft. This horizontal shaft is driven by a toothed top roller, which, in turn, is driven directly by the track.

The reel shaft can be driven either clockwise or counterclockwise, and the wire is either fed out of, or returned to, the reel through rubber rollers and spindles on the left, right, or center of the vehicle. Racks in the rear of the machinery compartment can store approximately 20 reels of wire, and the



A Japanese half-track combination personnel carrier and prime mover.

vehicle is equipped with a wire-crimping device for repairing breaks in wire lines.

TRACK AND RAIL VEHICLE

Two vehicles, equipped with wheels for rail travel and tracks for ground travel, have been captured at Thedaw, Burma. Although specific use of these vehicles is unknown, it is believed they may have had a beam structure—none was found on either, but they are equipped with overhead "A" frames—and used as rail-laying vehicles or possibly for loading or unloading railroad cars or trucks. The rail wheels can be adjusted for wide or narrow gauge track by changing a spacer from inside the wheels to outside.

Eight bogie wheels carry the weight of the vehicle when it travels on the ground.

Mounted in the turret platform, which revolves 360 degrees,

are the engine, transmission, cable drum drives, cable drums, a small acetylene generator, tool compartments, operator's seat, and overhead "A" frame.

Power for driving the vehicle and operating its components is supplied by a single six-cylinder engine, rated at 68 horsepower at 2800 RPM. The engine is of "I" head design, with up-draft carburetor and magneto ignition.

Principal dimensions which were determined are: length, 16 feet; height, 9 feet 2 inches; width, 8 feet; and number of track links, 94.

HALF-TRACK VEHICLE

A Japanese half-track combination personnel carrier and prime mover, without armor or armament of any kind, has been recovered in Manila. It has a folding canvas top and four wide seats providing space for approximately 16 persons.

This commercial-type wheeled tractor was captured in the Philippines.

Storage compartments for luggage and equipment are provided under the seats, and the vehicle is equipped with a large winch and a towing pintle at the rear of the body. The engine is a six-cylinder, valve-in-head, water-cooled Diesel type, and a selective transmission provides four speeds forward and one in reverse.

The track and suspension are of the conventional Japanese design. The track is an all-steel center guide type. Four bogie wheels are mounted on two bell-crank bogies, with the usual horizontal compression springs.

Principal dimensions which were determined are: length, 18 feet 3 inches; height, 7 feet 10 inches; width, 6 feet 4 inches; ground clearance, 13 inches; width of track, 8 inches; ground contact of track, 6 feet 5 inches; and number of track links, 64.

GENERAL PURPOSE TRACTOR

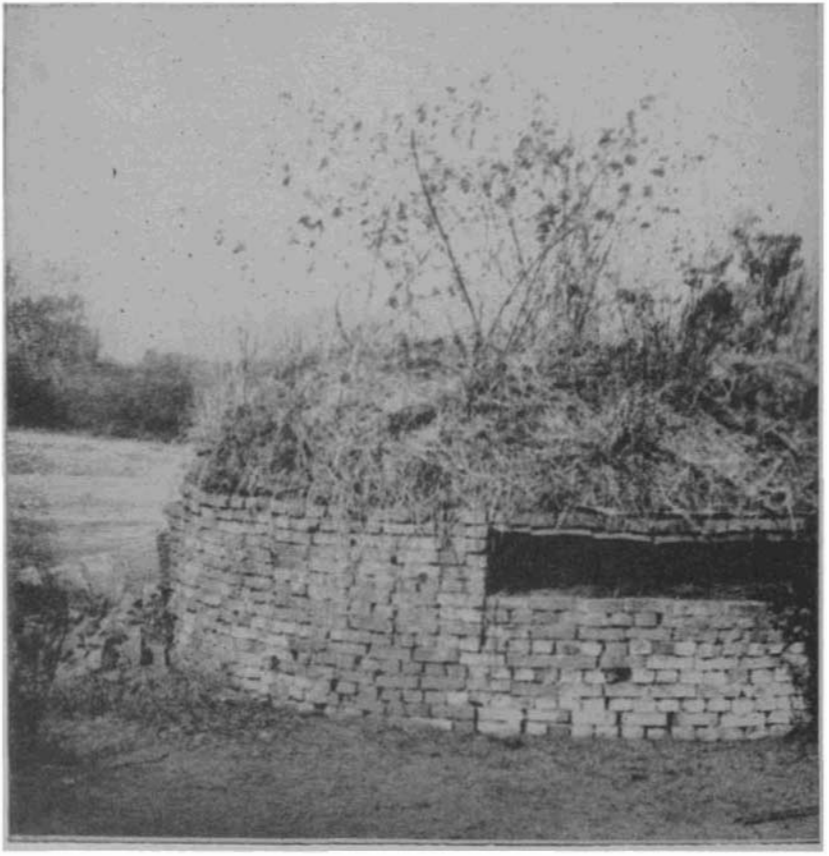
A Kato-type wheeled tractor was captured near Zamboanga, Mindanao, Philippine Islands. It is a four-wheel tractor driven by its dual rear wheels. It has 8 inches ground clearance, and is steered by a worm gear system which operates the front wheels.

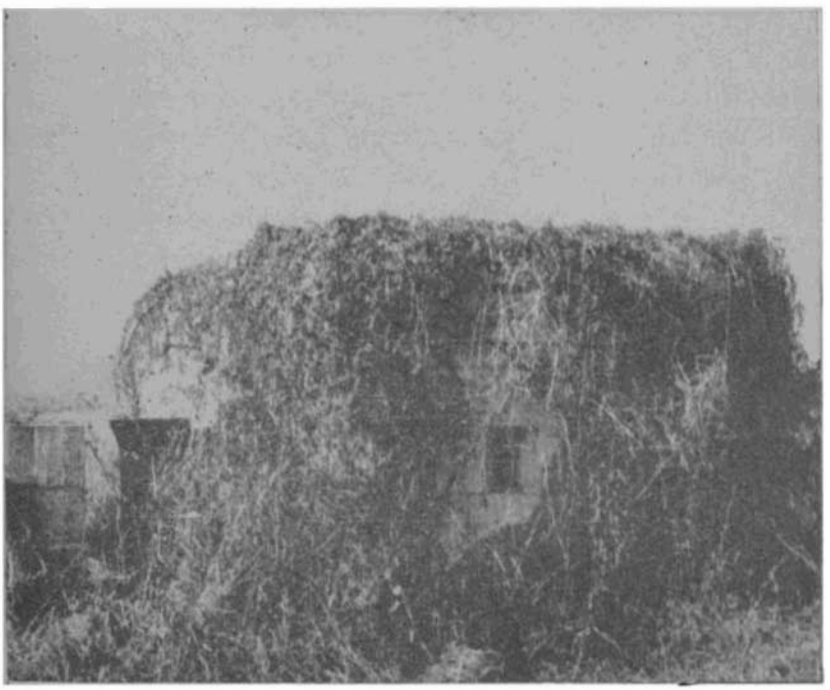
Equipped with front and rear towing pintles cast solid with the frame, the tractor has normal automotive controls except that a hand-operated throttle replaces the foot throttle. The transmission provides three speeds forward and two in reverse. The fuel tank is mounted above the transmission and holds about 30 gallons.

The engine is a four-cylinder, valve-in-head gasoline type, identical with that used in the Kato 70 tractor. A K-3 type engine was made in December 1943, and is rated at 60 horsepower at 1200 RPM.

BURMA PILLBOXES

The effectiveness of the camouflage is an outstanding feature of the Japanese pillboxes shown on this and the following page. The three strongpoints were discovered in Burma. Concrete pillboxes served as protection for the airfield at Lashio, and brick and wooden pillboxes were found in the Mandalay area.





DEMOLITIONS AND OBSTACLES

Jap Technique Is Spotty

Thus far Jap demolitions technique has been strikingly inconsistent, and its effectiveness has varied greatly. Similarly, the employment of road blocks and other obstacles has been spotty.

Although Allied troops advancing through Burma discovered many examples of engineering weakness, U. S. forces entering Manila found plenty of evidence that some Jap engineers are both equipped and trained to carry out effective demolitions.

Available reports do not make clear any specific inadequacies which might have caused the weaknesses in Japanese demolitions and obstacles. Three general factors, however, emerge: lack of equipment; lack of trained troops; and, above all, lack of time.

JAPANESE PLANS

The enemy on Okinawa set up a plan for delaying the progress of American tanks. Rarely-used roads in the coastal belt were to be demolished, and land mines and other obstacles were to be prepared for the widely-used roads further inland.

In Manila the defense detachment was ordered to take charge of preparations for protection and destruction of the city's

main installations, especially the bridges. The use of key traffic points was to be denied to Allied armored vehicles.

Complete and thorough demolition of bridges was ordered, and guards were to be posted at the principal structures to prevent guerrilla action in rebuilding the bridges and to halt speedy transmission of intelligence.

In destroying bridges, the Japs are told to cut the pier in the center of a river by blasting. The abutment should be destroyed at one or both ends of the bridge or the bridge surface demolished at the center, depending on the situation.

Although the examples given in the following pages are too few in number and too widely scattered to suggest definite conclusions, they at least give an idea of the inconsistency of the Japs in this type of warfare. It can be seen in many cases that Japanese accomplishments varied widely within a single theater.

BRIDGES AND RAILROADS

Bridge demolitions in Burma ranged from poor to good. Much of the destruction appeared to have been carried out only for tactical reasons to secure a delay of a few hours. In many instances, bridge spans, rather than abutments, were destroyed.

In one Burma area, many of the bridges had been knocked out by Allied bombing, but Japanese destruction of the rest was confined almost solely to attempts to burn or saw through them.

Built mostly of teak wood, which did not burn well, many bridges were smoldering and only partly destroyed at the time of their capture. Although thorough demolition in many cases would have resulted in serious delays, the Japs used only a small amount of explosives.

Demolitions on the north Burma railway was mediocre at first, but later the Japs became more proficient and did their

best demolition work of the Burma campaign. In destroying railway facilities, the Japs concentrated on bridges, switches, rolling stock, and rails and sleepers, in that order. In all, 34 bridges were destroyed on this line.

At one point along this railroad every steel bridge more than 44 feet long was demolished by explosives, and every wooden bridge was burned. In using explosives, the Japs placed charges in the center and blew out the girders. The abutments were not attacked in the later stages of the campaign, possibly because this system had not worked well earlier.

In the final phases of the campaign, all switches in every station were demolished by explosives. Previous destruction had been confined to attempts to remove some of them. In destroying rolling stock, the Japs smashed axle boxes with sledge hammers and burned wooden bodies. Removal or demolition of rails and sleepers was attempted only rarely, and no consistent plan was followed.

In another area of Burma there appeared to be no set demolition plan, ond only one or two bridges had been prepared for destruction, usually with electrically fuzed aerial bombs. The Allied advance was so swift, however, that the enemy apparently did not have time to set off the explosives.

Bridge demolition was better executed and destruction was more nearly complete in the Manila area than in other places on Luzon and in Burma. Of the 101 bridges in Manila, 39 were destroyed.

Most of the bridges destroyed, including the six over the Pasig River, joining the northern and southern parts of the city, were from 100 to 400 feet long, while those left intact usually were much shorter, not exceeding 70 feet in length. Except for certain bridges over the Pasig, which were not knocked out until U. S. forces reached the northern bank of the river, all bridges were blown before American troops reached the city.

Multiple-span bridges in Manila usually were blown on the enemy side; concrete slab bridges were rendered useless by destruction of the bridge decking; concrete arch-type bridges were blown in the middle sections; and steel truss bridges were sheared close to the supports with only abutments and piers left standing. No bridges of any type were found prepared for time demolition.

U. S. forces on Okinawa also encountered fairly well-planned demolitions of transportation facilities. All culverts and bridges had been destroyed by the retreating Japs.

AIRFIELDS

While Japanese demolition of airfields in Burma was not extensive, there were instances where use of the fields was denied to Allied forces for at least several days. A few fields were rendered temporarily unserviceable by craters, ditches, logs, and wooden horses.

Chief criticisms of the Japanese technique in Burma were that they did not make greater use of temporary obstacles, such as logs and wooden horses, and that no easily placed obstacles were laid along the secondary runways and taxiways.

TOWN AND AREA DEMOLITIONS

In many instances, the forcing and subsequent occupation of small sections of fortified buildings in Manila resulted in controlled blasts affecting only the portions held by U. S. forces. Charges were usually too light to cause the destruction intended by the enemy, but obstacles which necessitated re-entry by another route were often created.

During the recent Australian invasion of Borneo, other examples of town and area demolition were encountered. According to reports, both Labuan and Brooketon were almost completely destroyed by Japanese demolitions. Numerous ex-

amples of the wholesale destruction of oil refinery and storage areas have also been encountered with the Japanese applying the torch to all usable fuel facilities.

The destruction of equipment and supplies has been as inconsistent as other Jap attempts at demolition. Attempts to destroy two tanks and a vehicle in one area in Burma were described as "childish and ineffective."

On the other hand, it was learned from enemy sources on Okinawa that all guns knocked out by American fire were to be demolished immediately to eliminate all traces of them.

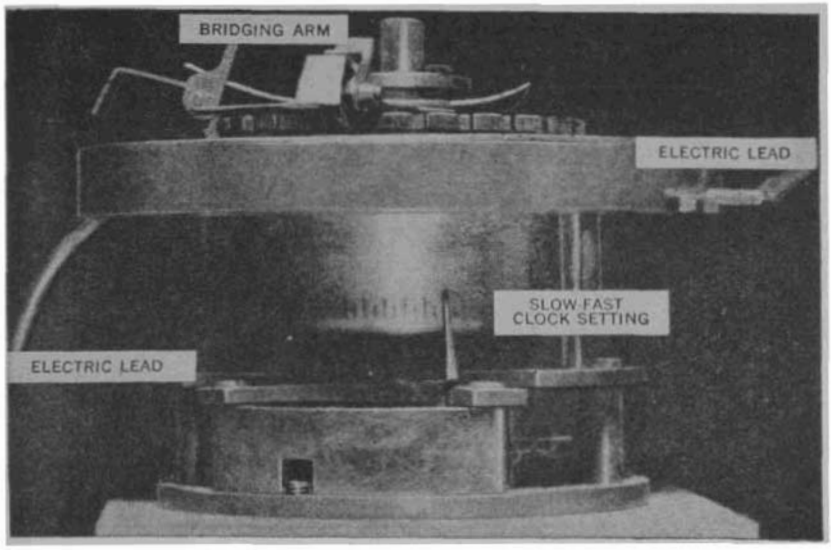
OBSTACLES

Road blocks and obstacles encountered in Burma were inadequate in almost all instances. In one area the only obstructions consisted of trees felled across roads. Other obstacles were scattered mines, buried aerial bombs with fuzes up and covered with railway ties, and booby-trapped fuel drums.

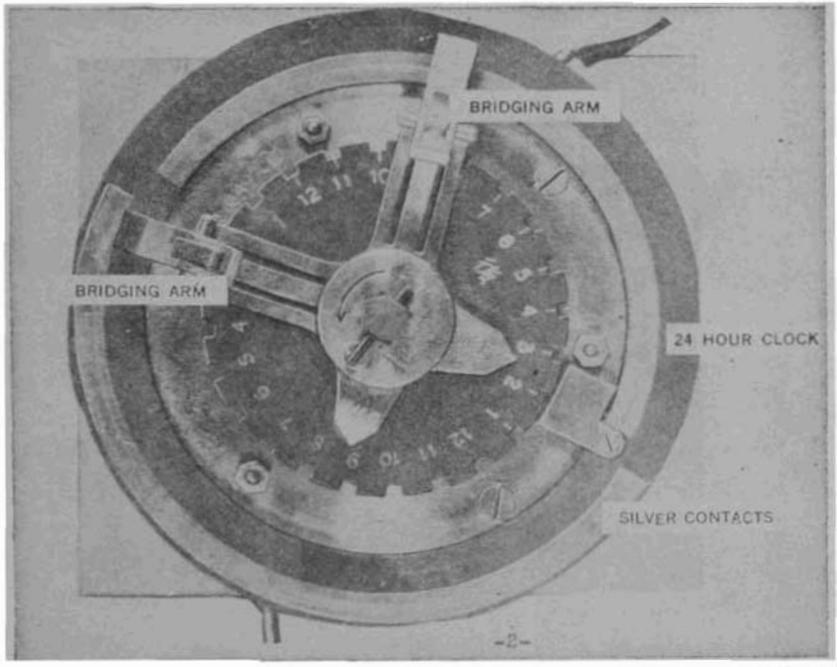
In another area no antitank ditches at all were encountered. Some canal crossings had been converted into antitank obstacles, but the Japs had passed up an excellent chance to utilize the sloping canal banks as tank traps. The only real road block encountered by two divisions in this campaign consisted of railroad rails and ties wedged in between trees lining the road.

Pole charges, manual labor, and haulage with tanks were required to remove the obstacles in another area. The obstacles were described as a "motley assembly" of trucks, barbed wire, stone walls, sacks of gravel or earth, tree trunks, and general debris.

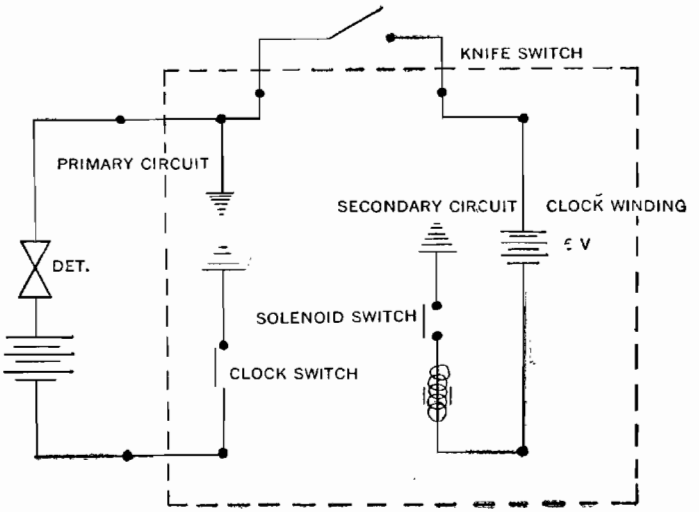
Felled trees and junked equipment comprised most of the road blocks on Okinawa, although narrow mountain roads frequently were ditched.



Side view of Japanese 24-hour demolition clock.



Top view of Japanese 24-hour demolition clock.



Circuit diagram of Jap Type 99 (1939) 10½-day demolition clock.

Road blocks have also been encountered at numerous places on Luzon. In one particular locality eight blocks were encountered at intervals of 200 to 300 yards. Some were made by blasting earth and rocks onto the highway from adjacent high ground; others consisted of large trees felled across the road and reinforced with logs; and a few appeared to be of the saw-horse type, made with barbed wire.

DEMOLITION CLOCKS

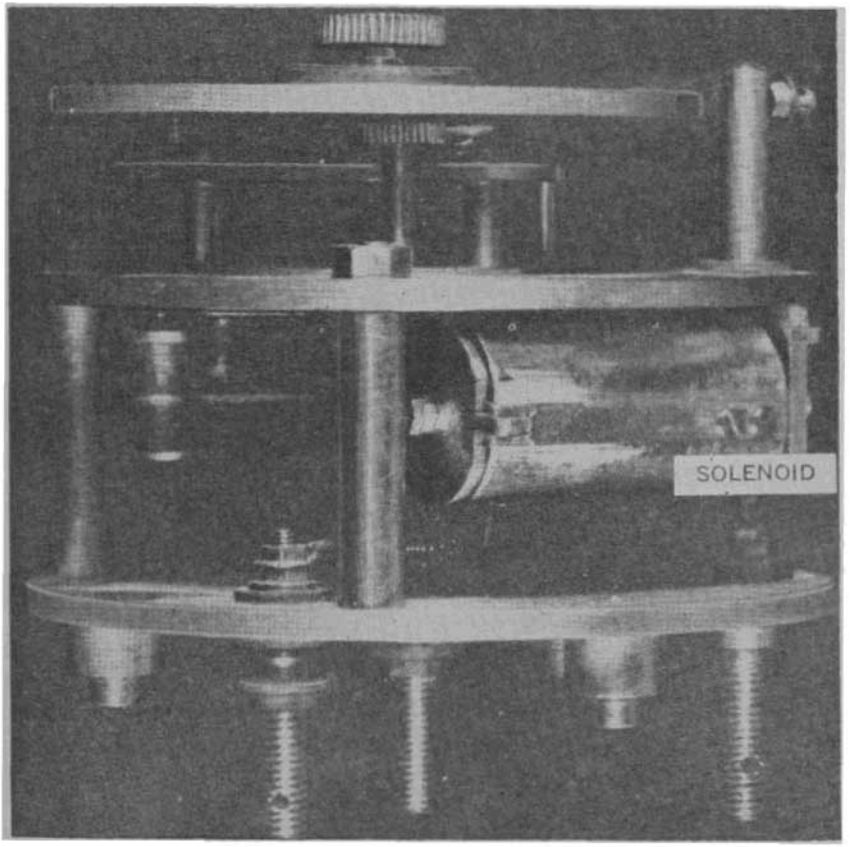
Even though Japanese demolitions in many cases have not been up to par and explosives have been notably ignored, the enemy has come up with a steady succession of new explosives throughout the war. The latest include four demolition clocks and two improvised types of charges.

Four types of Japanese demolition clocks have been recovered fairly recently in the Pacific area. Used either as demolition charges or as land mines in most cases, they are the Type 92 (1932) 7-day clock, the Type 99 (1939) 10½-day clock,

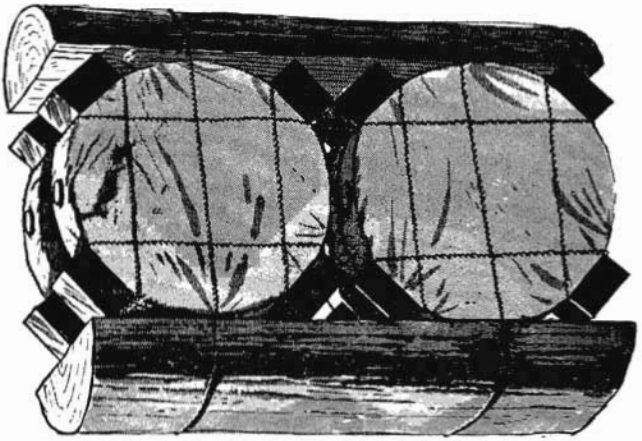
the 24-hour clock (Japanese designation unknown), and the 7½-day clock (Japanese designation unknown).

The 24-hour clock has time settings for a day in 1-hour increments. It is spring driven and its dial revolves clockwise, carrying two bridging contact arms which close a circuit on completion of the set run. Neutralization is effected by cutting or disconnecting the external leads.

Settings on the Type 99 clock are possible up to 10½ days in 2-hour increments. Electrically wound and spring driven, the clockwork runs off approximately every 4 minutes 45 sec-



Side view of Japanese Type 99 (1939) demolition clock.



Japanese improvised demolition charge found in Burma.

onds, closing a solenoid circuit which rewinds the spring. The dial, calibrated in days and 2-hour increments, rotates clockwise. At the end of its set run, action of a spring-loaded bridging arm closes the firing circuit. The clock is in a sturdy wooden box, 5¼ inches wide, 4⅝ inches high, and 6¾ inches long. Neutralization is accomplished by cutting or disconnecting the external leads.

The Type 92 clock has settings up to 7 days in 5-minute increments. Spring driven, the clock may be fired mechanically or electrically. A percussion cap and safety fuze are inserted into the base of the clock for mechanical firing; the switch closes a battery circuit and leads are attached to the base of the clock for connection to an electric detonator for electrical firing. Shaped like a cylinder, the clock is about 7 inches high and 3½ inches in diameter. Neutralization may be effected by cutting or disconnecting the external leads and by cutting or disassembling any attached explosive train.

Apparently of European design, the 7½-day clock is a finely made jeweled mechanism, and is graduated in 1-hour incre-

ments. Spring driven, the clock has a firing assembly consisting of a firing pin, a firing pin retainer, a retainer arm, and a release arm. When the set time has elapsed, action of the firing slot and release arm frees the retainer arm. The retainer arm in turn releases the firing pin, which is driven under spring pressure against the primer. The clock is in a brass case 2 11/16 inches long, 2⅜ inches wide, and ⅞ of an inch thick.

IMPROVISED CHARGES

One improvised charge consisted of two cardboard boxes containing about 50 sticks of dynamite, three fuzes with delay trains and detonator attachments, a wooden box to hold the cartons of dynamite, and a large piece of white sacking, fastened down with rope and wire for carrying purposes, to cover the wooden box. The charge is armed by inserting the fuzes in the side through two roughly cut holes. Two of the fuzes recovered incorporated 2½-inch delay trains and the other was the same type without delay attachment. The fuzes were friction-type igniters.

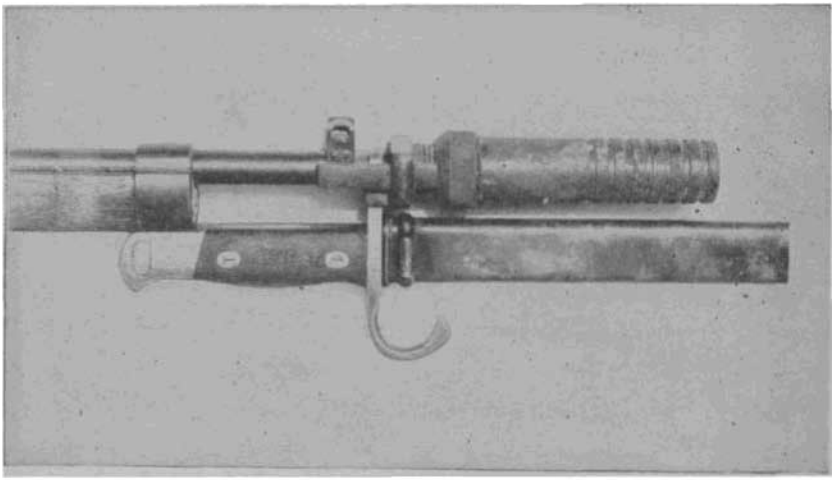
Of the same general design as the first, the other improvised charge (see accompanying sketch) consisted of four magnetic mines with two bulk picric charges placed between each pair of mines. The charge was held in place by tying the two pairs of mines together and bracing them with two sticks of wood. Methods of fuzing and firing were not determined.

TECHNICAL NOTES

NEW RIFLE GRENADE LAUNCHER

A new Japanese spigot-type rifle grenade launcher has been recovered on Luzon. This launcher, which resembles the U. S. rifle grenade launcher both in appearance and function, is slightly larger in diameter than previously recovered spigot-type launchers, and can be used on both standard Jap rifles—the Type 38 (1905) 6.5-mm and the Type 99 (1939) 7.7-mm.

Weighing approximately 1 pound, the launcher is fitted to the muzzle of the rifle by two locking arms that clamp in place



New spigot-type rifle grenade launcher.

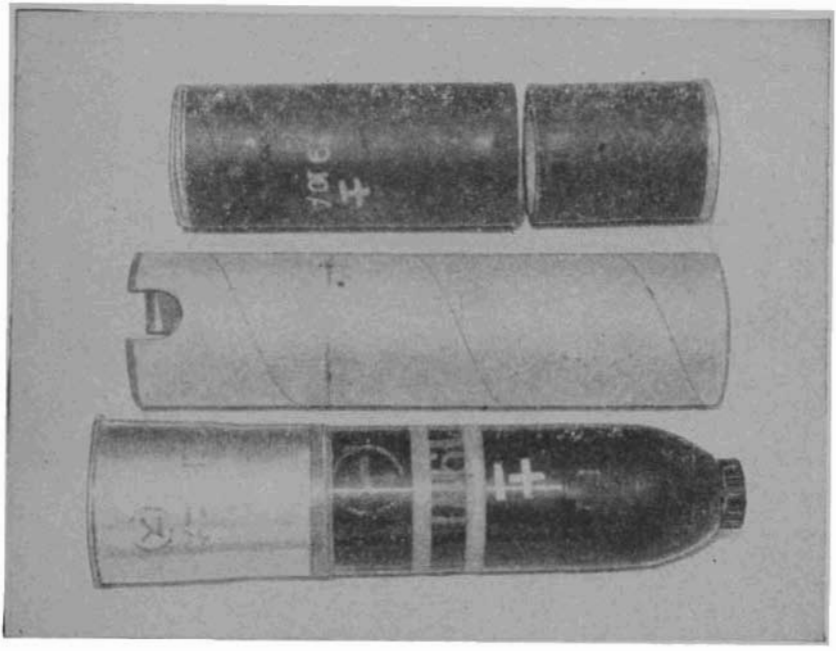
behind the front sight mount. It is believed to fire both an impact rifle grenade, and an incendiary rifle grenade.

IMPROVED AMMUNITION PACKAGING

Japanese ammunition packaging is beginning to show conspicuous improvement, and is affording much better protection against the elements. Recent packaging methods, many of them

of U. S. derivation, have substantially decreased the percentage of duds and misfires caused by exposure.

Although several types of Japanese containers have been virtual duplications of U. S. packages, no attempt has yet been made to copy the U. S. cloverleaf package assembly. Furthermore, it seems unlikely that the Japs will make such a move, since most Jap ammunition boxes are designed for lighter loads.



Projectile for Type 92 (1932) 70-mm howitzer, container liner, and container. This is an interesting example of the Japanese trend of imitating U. S. ammunition packaging.

In quality, many of the Jap ammunition containers recovered have compared favorably with U. S. packages, and one of the fiber cases contained finger notches in the liner, which facilitated the removal of a round swelled by moisture.

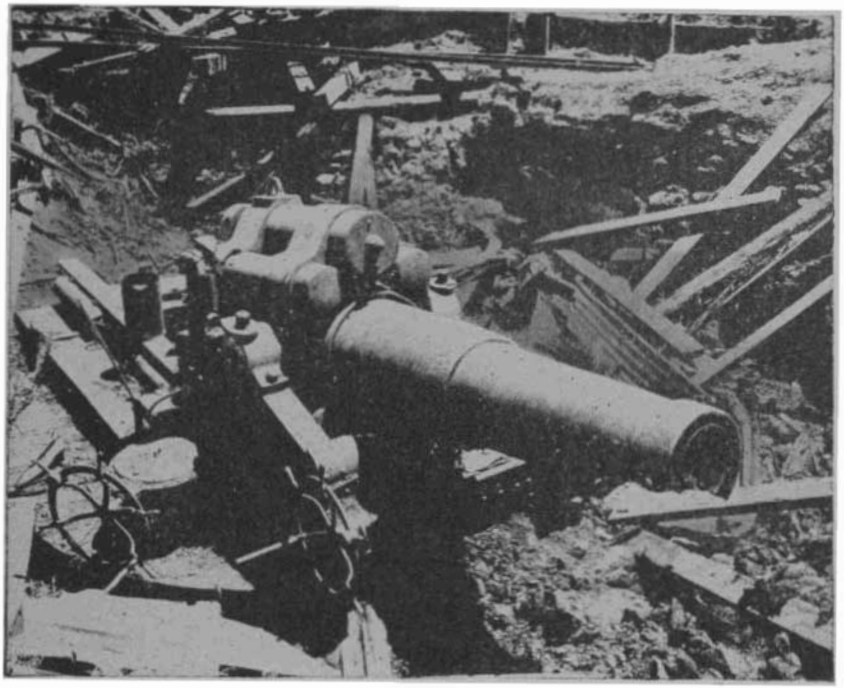
Shortly after the outbreak of the Pacific war, the Jap Army realized the necessity for improving its packaging. Although at that time Japanese naval ammunition was found packed in watertight containers, Army ammunition was shipped in plain wooden boxes which afforded no protection against moisture. Duds and misfires often occurred in 80 to 90 percent of exposed ammunition.

Beginning in 1943, U. S. forces discovered that the Japanese had begun to line ammunition boxes with asphalt-impregnated paper. The enemy then supplemented this method by using screw-top cans sealed with paraffin and by pasting paper over the primers of artillery rounds. The percentage of bad ammunition was reduced materially, although about 10 percent of the grenades and mortars still were useless.

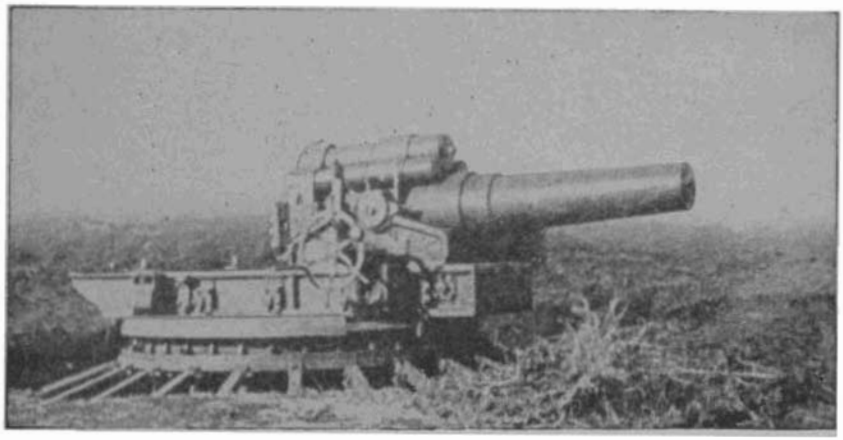
By 1944 paper-lined and metal-lined boxes were appearing in increasing numbers, and some grenades and grenade discharger projectiles were found packed in fiber containers with metal ends, very similar to U. S. fiber cases. Grenades carried by Jap paratroops landing on Leyte were still in the fiber containers when recovered, indicating that the containers were meant to protect the ammunition almost up to the moment of use.

JAPS' 305-MM HOWITZER RESEMBLES THEIR 240

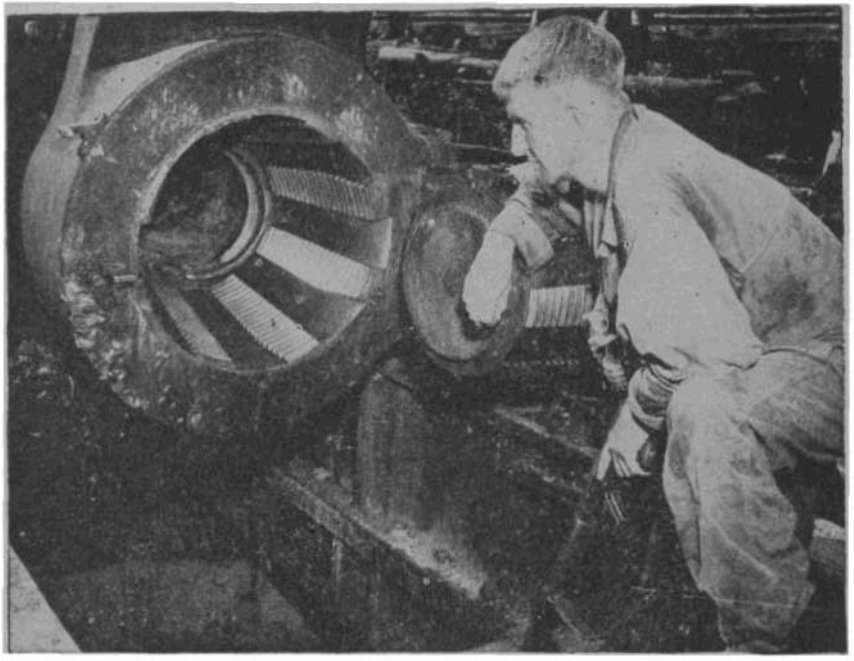
Photos of the Japanese Type 7 (1918) 305-mm short howitzer reveal that this weapon is patterned after the more familiar Type 45 (1912) 240-mm howitzer. The short 305 is supposed to be a standard piece of army artillery, and was recovered for the first time on Luzon (see TACTICAL AND TECHNICAL TRENDS, Number 58). The 240, while not yet captured, has been known through its use at Tsingtao in World War I, and through military observers at Japanese peacetime maneuvers.



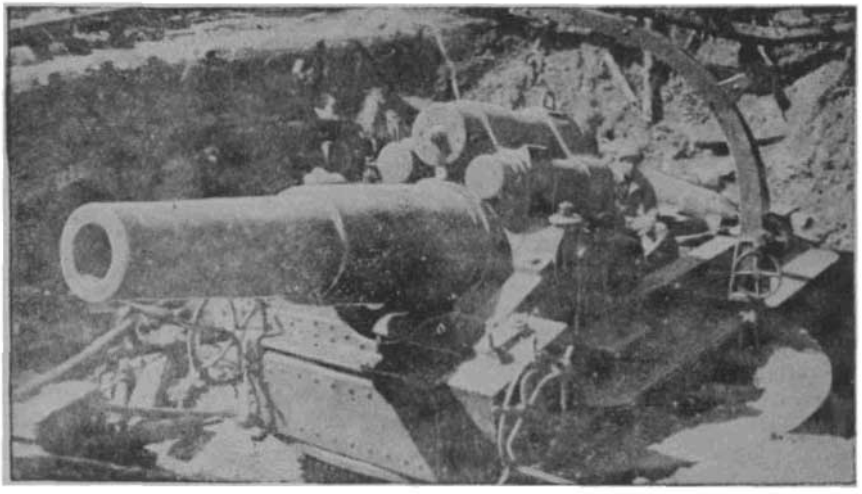
The Type 7 (1918) short 305-mm howitzer recovered on Luzon has a tube and platform mount which help to differentiate it from the 240-mm howitzer.



The Type 45 (1912) 240-mm howitzer is here shown in a partially completed emplacement, the base not yet having been covered with soil.



The left side of the Type 7 305-mm howitzer is fitted with a loading crane. On-carriage fire-control equipment has been removed.

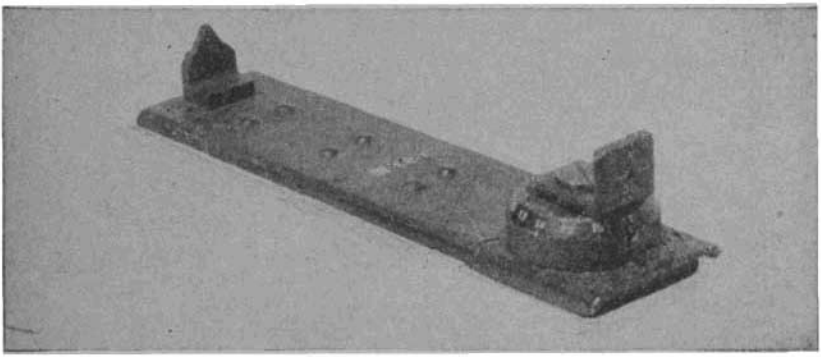


Both Type 7 and Type 45 howitzers use this type of interrupted thread in the breech ring. This is the Type 7. Note the pit for recoil.

Similarities between the two guns occur in the recoil mechanism (above the tube), top carriage, breech ring, and type of interrupted screw breech block.

MECHANICAL SIGHT FOR ANTITANK GUN

Although the Japanese 47-mm antitank gun is normally equipped with a telescopic sight, a mechanical sight of more rugged design has been found on a captured gun on Luzon.



Mechanical sight for Japanese 47-mm antitank gun.

This sight may be intended to replace the more intricate telescopic model, but is more probably a spare sight carried with the weapon in case the optical sight should be damaged. The sight assembly has a dovetailed base, which fits into the same sight bracket as the optical sight.

The sight itself consists of a metal plate, 2 inches wide and approximately 8 inches long, having a nonadjustable inverted V on the front of the plate and an adjustable peep on the rear. The peep sight is mounted on a pivot, around which a circular range drum rotates. This drum is graduated from 0 to 1700 meters in 100-meter units. The peep moves upward when the drum is rotated to the left, and down when rotated to the right.

Although this sight may be useful for emergencies, there is no provision for leading a moving target. Consequently, accurate fire at a moving target at long ranges is almost impossible.

SMALL ISLAND MINEFIELDS

On Ie Shima, a small island off Okinawa, the Japanese converted a large number of aerial bombs into antitank mines. At least a thousand of these bombs, weighing approximately 250 pounds each, were buried nose up in one minefield inland from the beach area. The minefield was a mile long and 50 yards wide. The island's crossroads and adjacent fields—which the enemy anticipated that U. S. tanks and heavy guns would probably cross—also were mined.

These mines probably were 100-kg Army general-purpose bombs. Some had regular bomb fuzes, but there are indications that the combination pressure-pull fuzes normally used with Type 3 land mines may also have been used in some of the aerial bombs.

In several instances, a single aerial bomb was surrounded by four antipersonnel mines emplaced at a distance of about 10 yards.

An antipersonnel minefield similar to one met by American forces on Iwo was found on the beach fronting the principal town on Ie. The field was 50 feet wide, 300 feet long, and contained about 150 mines—reported to be wooden box mines containing 15 to 20 pounds of picric acid. A Jap officer and four men equipped with mines of this type made an unsuccessful suicide attack against a U. S. beach perimeter. The mines used in the attack had no igniting devices and presumably were to be detonated by grenades.

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[1] The numerals in bold-face type denote the BULLETIN number; the numerals which follow denote page numbers.

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